This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

THE ORCHARD-HOUSE

T. FRANCIS RIVERS.

THE CULTIVATION OF FRUIT-TREES UNDER GLASS

LONDON : PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET

THE

ORCHARD-HOUSE

(OF THOMAS RIVERS)

OR THE

CULTIVATION OF FRUIT-TREES UNDER GLASS

SIXTEENTH EDITION

EDITED AND ARRANGED

BY

T. FRANCIS RIVERS

> ‘There is no lack of fruit—under a fair crystal canopy
> Embosoming the smiles of heaven, but warding off its frowns.
> Generous and grateful, like all Nature's gifts,
> Mark the luscious peach and nectarine
> And friendly fruits that charm mankind,
> Pouring a bounteous store with full hands,
> Until the kindly winter gathers them to rest.

BIBLIOTHECA
AUG 1879
BODLEIANA

LONDON
LONGMANS, GREEN, AND CO.
1879

All rights reserved

191. j. 122.

PREFACE

TO

THE SIXTEENTH EDITION.

THE lines of a ship, when well and truly laid, will serve for ships built on the same lines for all time, and though changes in form and fashion may be made, there need be no change made in a design by which a vessel will float and sail, and by which safety, speed, and stowage are combined.

The principles of the practice for the cultivation and management of trees in an orchard-house were so true when laid down, that little deviation from them can be made in the edition now published: but the experience gained during the progress of sixteen editions has enabled me to add something to the rules laid down in the earlier editions, but I have not found it necessary to depart in any great degree from the literary work of a hand and brain now at rest for ever.

For many years I have been much interested in orchard-house culture, and have given much personal attention to the work of producing variations in fruits by raising seedlings, and I may fairly claim to have achieved some success. The knowledge and experience which are gained by personal attention must be my apology for the assumption of authorship, and with this assumption I accept also the full measure of responsibility. No theory has been advanced which has not been carried into practice; and the unfailing test of personal examination is open to all. The first of the series of orchard-houses from which the practical rules have been prepared, was built in 1850. After some years the trees became too large for the small original houses, and larger houses were built. Many of the trees have been twenty-five years in pots, and are still full of fruit and vigour. As they have never ceased to bear fruit year by year, the conditions of climate and culture must be eminently favourable to the health and longevity of the tree. The long and severe winter of 1878 and 1879 that we have just endured has left my orchard-house trees unscathed. I am afraid that on walls the same immunity will not be enjoyed. The winter will, I am sure, have injured the growth of many peach and nectarine-trees, and will prove that culture under glass in some form or other must be the only means of ensuring a constant supply of these delicious fruits. In the cold and wet districts of England it is quite hopeless to attempt their cultivation without protection.

The diagrams of the first plainly built houses have been again inserted in this edition. They answered their purpose, and still answer. Horticultural builders have now, however, fully recognised the necessity of building fruit-houses; and those who desire more elaborate buildings can have their wishes carried out. The plain designs engraved in the work will, however, perform what they are designed to do, *i.e.* grow and ripen fruit.

Although the author of previous editions lived beyond the period usually allotted to man, it is a painful, although a pleasing task, to carry on a work designed by another hand; but I trust that I am not unmindful of the thanks due for the privilege of being permitted to continue an undertaking so persistent in its success.

T. FRANCIS RIVERS.

BONK'S HILL, SAWBRIDGWORTH:
June, 1879.

CONTENTS.

PAGE

THE LEAN-TO ORCHARD-HOUSE 5

THE SMALL SPAN-ROOFED ORCHARD-HOUSE 16

THE LARGE SPAN-ROOFED ORCHARD-HOUSE 23

ORCHARD-HOUSES AS SANATORIUMS 36

PORTABLE ORCHARD-HOUSES 38

GENERAL CULTURE 42

Apricots 53, 232
  as Pyramids 68
Peaches and Nectarines 71
  as Diagonal Trees 96
  as Pyramids 100, 104
Miniature Trees 109
Plums 121
Cherries 128
Figs 133, 203
Pears 136
Grapes 151
Vines in Pots on Hot-Water Pipes 155
Vineyard under Glass 159
Apples 163
Mulberries 166
Strawberries 167
Almonds 170, 234

THE FORCING ORCHARD-HOUSE 171

THE HEDGE ORCHARD-HOUSE 180

PAGE
THE TROPICAL ORCHARD-HOUSE 182
HOW TO FORM AN ORANGE-GROVE 194
INSECTS, AND HOW TO DESTROY THEM 206
MONTHLY CALENDAR FOR THE MANAGEMENT OF THE ORCHARD-HOUSE THROUGHOUT THE YEAR . . . 210
CONCLUSION 261

APPENDIX.

I. The Rationale of Orchard-House Culture 247
II. The Orchard-House at Blackrock, Dublin 253
III. Trained Trees in Pots 257

INDEX 263

LIST OF ILLUSTRATIONS.

FIG. PAGE

1, 2. ENDS OF RAFTERS 6

3. BACK OF ORCHARD-HOUSE 8

4. SECTION OF THE LEAN-TO ORCHARD-HOUSE . . . 10

5. SECTION OF THE LEAN-TO ORCHARD-HOUSE . . . 13

6. SPAN-ROOFED ORCHARD-HOUSE 16

7. SECTION OF THE SMALL SPAN-ROOFED ORCHARD-HOUSE . 19

8. TRANSVERSE SECTION OF ORCHARD-HOUSE, 24 FEET WIDE 24

9. SECTION OF ORCHARD-HOUSE, 24 FEET WIDE . . . 27

10. END ELEVATION OF AN ORCHARD-HOUSE, 24 FEET WIDE 27

11. SECTION OF SEMI-SPAN HOUSE, 15 FEET WIDE. . . 28

12. AN ELRUGE NECTARINE-TREE, THREE YEARS OLD . 72

13. A PYRAMID OF THE RIVERS'S EARLY YORK PEACH, FROM A PHOTOGRAPH. TREE SEVEN YEARS OLD . 76

14. AUTUMNAL TOP-DRESSING-TOOL 88

15. A HALF-STANDARD TREE OF THE ALEXANDRA PEACH (FROM A PHOTOGRAPH) 95

16. A DIAGONAL TRAINED PEACH-TREE 97

17. A PEACH-TREE PRUNED TO FORM A CLOSE PYRAMID . 101

18. A PYRAMIDAL PEACH-TREE, THREE YEARS OLD (FROM A PHOTOGRAPH, JULY, 1870) 102

FIG. PAGE
19. LEAF PINCHING 106
20. GREEN GAGE. 74 FRUIT. (FROM A PHOTOGRAPH TAKEN AT GISHURST COTTAGE, WEYBRIDGE HEATH) . 125
21. A PYRAMID OF THE LOUISE BONNE OF JERSEY PEAR (FROM A PHOTOGRAPH) 137
22. A PHOTOGRAPH OF A BLACK HAMBURG GRAPE VINE, THREE YEARS OLD 152
23. SHOOT PINCHING 215
24. ROOTS OF ZANTE VINE, PRUNED AND UNPRUNED . . 251
25. DESIGN FOR ORCHARD-HOUSE . . . . . *to face* 256
26. TRAINED PYRAMID PEACH 259

Errata.

Page 6, line 18, *for* fig. 1 *read* fig. 2.
„ 7, „ 1, *for* fig. 2 *read* fig. 1.
„ 256 „ 7 from foot, *for* fig. 27 *read* fig. 25.

INTRODUCTION.

Experience in Orchard-house Culture is progressive; and in publishing this Sixteenth Edition of my little book to the Horticultural world, I have endeavoured to tell all I have learnt since the last was issued. There are, as a matter of course, still doubters as to the feasibility of cultivating fruit trees under glass after the methods given in the following pages: such persons are difficult to move—let them doubt on in peace and quietness. For those persons who, from ignorance or from some interested motive are given to contest the principle of orchard-house cultivation, I beg to submit the following results, produced in an orchard-house 100 feet by 24 feet, the size of a very moderate strawberry-bed:—

Forty pyramid peach and nectarine trees, 8 to 10 feet high, each 2 dozen		=	960
Twenty-eight ditto 3 feet, each 1 dozen		=	336
Sixty-seven half-standards, 4 to 6 feet, each 1 dozen		=	804
Twenty ditto large, each 2½ dozen		=	600
Fifteen ditto apricots, large, each 3 dozen		=	540
Twelve ditto small, each 1 dozen		=	144
Six standard trees, peaches, planted out, occupying the space of 4 pyramid trees in pots	each 6 dozen	=	432
			3,816

Or nearly 4,000 fruit.

I may say that this quantity is underrated rather than overstated. I hope that this produce will be thought worthy of some extra care. The house in question has now been built about fourteen years, and has produced a like crop without intermission, many of the trees being twenty years old, so-called good and bad seasons having no influence whatever on the produce.

The failure of wall fruit during many seasons has brought into high relief the advantages offered by the orchard-house; amongst these I may claim the entire immunity from the accidents of winter and spring frosts, and the range of the ripening season. My peaches commenced to ripen on July 6, slightly preceded by apricots; from this time to the second week in October fruit was gathered every day without intermission.

I have little to add to the rules of cultivation, which must be, in a measure, stereotyped, but I have seen reason to somewhat modify the summer pinching, which I thought necessary at one time for all trees. I still think it is necessary for very dwarf cultivation, but if the house is sufficiently large for trees 8 to 10 feet high, I think that more latitude may be given. Pyramid trees, the most beautiful of all when well grown, do not require the close and incessant pinching requisite for dwarf bushes.

The orchard-house has every year afforded me a delightful occupation, entirely removing the blank caused by the barrenness out of doors. Without it I should have been deprived of much interesting experience.

Nectarine trees have been especially productive of good fruit; many of the fruits measuring 9 to 10 inches in circumference, and peaches 12 to 14 inches; and I am sure that those who did me the honour of visiting me will testify that the quality of the fruit did not belie its external beauty.

The cultivation of Tangierine orange (one of the most delicious of our autumnal fruits), the Maltese Blood and the thin-rinded St. Michael's orange, which require the same treatment as the Tangierine, has been very interesting and successful. Orange-tree houses for the production of fruit only, and not as formerly, for their cultivation as ornamental trees and shrubs, will doubtless ere long be in every good garden.

For pear culture under glass I have given some further directions: but this is still in its infancy. It will ultimately be carried to a great extent, when the management of the trees is better understood by gardeners, unless with the refrigerating process it will become unnecessary to grow fruit in England at all! Apples, also, grafted on the English Paradise stock, are much more worthy of attention as orchard-house trees than they were at first thought to be. Apples grafted on this stock are so very dwarf and prolific, and form such charming little bushes, that they will ultimately be most popular.

It is not easy to add much to the knowledge already possessed; still there is ever something new in horticulture. The article on 'Raising Seedling Fruits' will, I think, be found worthy the attention of the amateur. Under glass culture, experiments may be carried out in hybridisation which would only result in failure if attempted in the open air. Although our tables are furnished with excellent fruits, the attempt to make a variation is, at all events, a very innocent and amusing, if not a very lofty occupation.

THE

ORCHARD-HOUSE.

'It was, I think, in the year 1849, that being very fond of figs, I attempted to grow them in pots in one of my vineries; but, finding they required more room than could be spared, I sought for some method by which I could overcome the difficulty. The pots used, I should state, were not placed on benches, but on raised borders, for I had adopted the sunken paths and raised borders for many years, to avoid the expense of the usual benches of wood. The roots made their way through the aperture at the bottom, and the plants thus, even in comparatively small pots, obtained enough of vigour to support a crop of fruit. After the crop was gathered, the pots were gently turned on one side, and the roots cut off with a knife; water was withheld, and the plants were soon at rest with well-ripened shoots. The following spring they were top-dressed with manure, and again placed on the border. But an idea occurred to me to give more room for the emission of roots by enlarging the aperture at the bottom of the pots: this I at once put in practice, with the most favourable results. I then reasoned, if figs in pots can be made to bear a crop of fruit by thus giving them extra nourishment during the summer, why should not peaches, nectarines, apricots, vines, plums, cherries, and pears be managed in the same way? They can be so managed; and I have much pleasure in giving the simple method by which all these choice fruits may be grown on trees in pots, with a certainty of a crop every season; and I hope to see the day when hundreds and thousands of our small gardens will be furnished with cheap fruit-tree houses.'

Glass, timber, and bricks are now comparatively cheap. Sheet-glass, which when first brought into notice cost 2*s.* per foot, can now be bought at 3*d.* per foot so we can build cheap houses, which, without the assistance of artificial heat, will give us, in average seasons, the climate of the south-west of France, without the liability to injury from spring frosts, from which the plants of all temperate climates, both in Europe and America, at times suffer so severely. Let us now see how nearly glass structures without fire-heat will approximate to the climate of France in one of its most temperate districts, viz. Angers.

The Chasselas de Fontainebleau grape, our Royal Muscadine, ripens at Orleans in the open air, in average seasons, on August 25: this is as nearly as possible the time when it ripens here under glass without artificial heat. The Black Hamburg grape ripens at Angers on September 25; in one of my vineries, in a warm situation, I have had them fully ripe on the 15th without fire-heat, the berries large, and their flavour exquisite. We can thus, at a little expense, in our own dear native land, reap the benefits of a warm climate, and enjoy its choice fruits, without suffering from its oppressive heat.

It may here be mentioned that the idea of the approximation of the climate of the orchard-house to that of the south-west of France is not imaginary; for some gardening friends from that region have said, on entering it, 'Ah! Monsieur Rivers, voici notre climat!'

An orchard-house in the south of England will give, as nearly as possible, the summer climate of Toulouse, where peaches, nectarines, apricots, and grapes ripen on standards and dwarfs, in orchards and gardens, in the open air, in great perfection.

'I believe that I have more than once described my "glass-roofed shed," for I have not ventured to give it too high-sounding a name: still, as it must come into extensive use, a better name may be found expressive of this peculiar structure, which is not a vinery, or pinery, or peach-house—these all belong to great gardens—but a place for many fruits; it may therefore, I think, without affectation, be called an Orchard-House—a place requiring but little expense to erect, but little experience and attention to manage, and yet giving most agreeable results. To the suburban gardener, who has but a small garden, which must be a *multum in parvo*—to the amateur, with plenty of gardening taste, and but a limited income—in short, to a numerous class fully capable of enjoying horticultural pleasures, but with purses not bountifully supplied, the orchard-house will, I feel assured, be a most agreeable boon. I shall therefore proceed to give such directions as will, I trust, enable any carpenter to build one. There are two descriptions of houses calculated for this mode of fruit-culture—the lean-to, and the span-roofed. I shall commence with the former, which is perhaps the cheapest and most simple of garden structures. It is indeed the poor man's orchard-house; for with a few shillings, and skill and industry, a small house may be built by the cottager, some apricots and peaches grown, and sold to his well-to-do neighbours, and his resources added to by a pleasant occupation.'

It is often objected that an orchard-house is an ugly structure, and has no place in the ornamental garden; but although the original idea of an orchard-house confined it to the kitchen garden, and as a protection only for fruit-trees during spring, there is no reason for making the buildings ugly; care must, however, be always taken that the floor is not encumbered with too much paving, the steady and constant evaporation from the soil being absolutely necessary to the health of the trees.

THE LEAN-TO ORCHARD HOUSE.

Its length may be from ten feet to one hundred or more, according to means and space; but its breadth and height should be according to the following dimensions, unless any improved plan may be suggested which will insure greater advantages at the same cost:—

I will suppose, then, an orchard-house 30 feet long is required. A ground-plan 30 feet long and 12 feet 6 inches wide, should be marked out. Then six posts of oak, or good yellow deal, 5 inches by 3, and from 10 feet to 11 feet 6 inches in length; or of larch-poles, 16 inches in girth, cut in two, and the flat sides placed outwards, must be firmly fixed 2 feet in the ground: the ground ends, before fixing, should be charred 2 feet 6 inches from the bottom, and then have a coat of boiling coal-tar, which adds much to their durability. They will form the back line of posts, standing 9 feet 6 inches in height from the surface of the ground. For the front wall six posts of the same thickness, 6 feet 6 inches long, must be firmly fixed 18 inches in the ground, so that they stand 5 feet out.[1] Two posts will be required at each end (at one end, if only one door is wanted); these will form the door-posts. On these posts, both at front and back, must be nailed a plate, 4 inches by 3, on which the rafters are to rest; the posts are thus arranged in two lines.

---

[1] These respective heights of front and back are a matter of choice; they may be increased one foot on both walls.

Now then for the rafters. These must be 14 feet long. A 9-inch deal, *i.e.* a deal 9 inches wide and 3 inches thick, will make four, each 4½ inches by 1½, or nearly so. These are light, strong, and the most economical of all. Instead of 'ploughing' the rebate for the glass (which is great labour and waste of material), on the upper side of each rafter, exactly in the centre, must be nailed a slip of ½-inch board, half an inch wide; this will leave half an inch of the rafter on each side for the glass to rest on (not too much for glass 20 inches in width). The rafters are so far prepared for glazing, but not yet fitted on the plates at top and bottom of the projected house; no mortises must be made, but the rafter fitted to the back plate by cutting out a piece as in fig. 1, and to the front plate

Fig. 1.

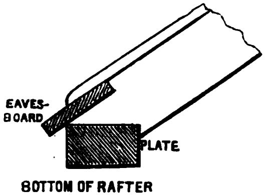
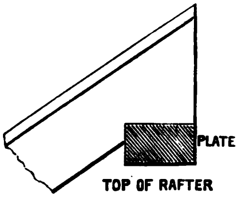
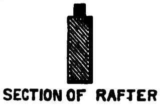


Fig. 2.



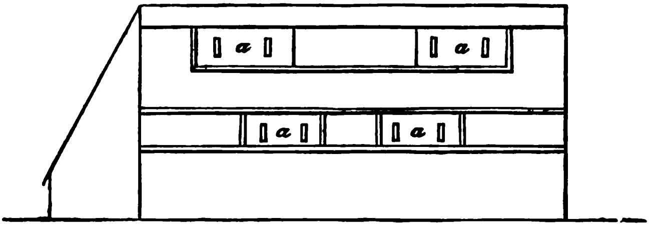


as in fig. 2. They must then be strongly nailed to the front and back plates, leaving a space between each rebate of 20 inches. A piece of ¾-inch deal board, 6 inches wide, should be nailed along the top to the end of each rafter, so as to be even with their upper edges, and in this should be a groove to receive the upper ends of the pieces of glass. At the bottom a piece of board, 1 inch thick and 6 inches wide, must be let in, by sawing a piece out of each rafter, for the glass to rest on and to carry off the water. We have thus formed a sloping roof, 8 feet 9 inches (with the plate) high at back, and 5 feet 3 inches high in front.

The glazing is now to be thought of. This is best done by placing a broad plank, 5 or 6 feet long and 2 inches thick, across the rafters, for the glazier to kneel on. Two 'brads' (small headless nails) should be driven into the rafter at the bottom corner of each piece of glass, so as to prevent its slipping down, which, with large pieces of glass, is very apt to occur; a bed of putty should be placed on each rebate for the glass to rest on, and the putty firmly placed over the pieces of glass in the usual way when it is fixed in its place, The laps should not exceed a quarter of an inch, and they need not be puttied, as the ventilation is more free when they are not. The most economical glass is 16-ounce British sheet-glass, which can be bought at 3*d.* per foot, and the size to be preferred 20 inches by 12, placing it crosswise, as the rafters should be 20 inches asunder. I find that scarcely any breakage takes place from frost, owing to the large pieces being elastic. I have quoted 16-ounce glass, as being cheap; the extra cost of 21-ounce glass is, however, worth incurring.

On and outside the back posts ¾-inch well-seasoned deal boards should be nailed. In the back wall thus formed, sliding shutters in grooves, 3 feet by 1 foot, must be fixed to act as ventilators—two close to the roof, and two 18 inches from the surface of the ground, as in the annexed sketch (the lower shutters in the back wall must always be on a level with the ventilating shutter in front); if two more be added to the right and left of the lower shutters, all the better: in *summer it is impossible to give too much air.*

Fig. 3.

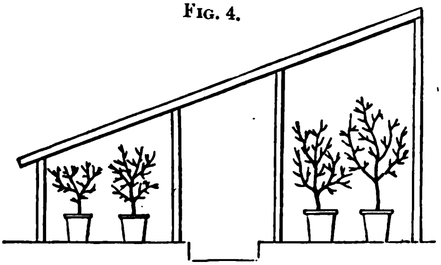


Back of Orchard-House.
a a a a Sliding shutters in grooves.

The front and ends (except the doorway) must also have ¾-inch boards nailed on outside the posts; one of them, the upper one in the front, to be on hinges, so as to let down the whole length of the house: this, with the back shutters, when all are open in hot weather, will ventilate thoroughly. To add to this, and it is all required in summer, the boards will shrink and let in air: a fierce sunlight is thus admitted by the large glass, and abundance of air, in which all fruit-trees thrive to admiration. The boards and rafters should be painted with stone-coloured paint, which will give the house a very neat appearance.

If required, more head-room may be given by making a sunken path 2 feet 6 inches wide, and 4 to 6 inches deep, in the centre of the ground-plan: this will leave a border on each side 4 feet 9 inches wide. The front border need not be raised, as the trees in two or three years will require all the head-room they can have; but the back border should be raised about 12 inches above the surface, and supported by a brick edge to the path; for the sides of the path must be supported with a 4-inch brick wall. The earth must be kept from the boards forming the back wall by a 4-inch brick wall. It will be found a great improvement (for which I am indebted to a friend) to divide the back border into two terraces by raising the back half 12 inches, building a 4-inch brick wall, and filling it with earth, so that the back row of trees is elevated, and thus escapes any shade given by the front row; the effect also is very good. Now, as everything depends on these borders—for there must be no benches and no shelves—care must be taken to make the surface firm, yet the soil rather loose underneath: loose materials, such as lime-rubbish from old walls, and road-sand, may be laid on them about 6 inches deep; these materials may then have a coat of loam 2 or 3 inches deep, which should be rammed to a level hard surface; you thus have two borders, not too far from the glass, and on which your orchard will thrive admirably. It is good practice to encourage the roots to come to the surface by rich surface dressings in summer; hence the advantage of a hard border, which does not encourage excessive rooting below. It will appear odd to read about trees thriving *on* instead of *in* a border; but when I explain that this is to be an orchard in pots, it will not seem so contrary to our usual garden-culture.

Fig. 4.



Section of the Lean-to Orchard-House.

It will be seen, I think, by the description I have given, that the lean-to orchard-house is merely a low greenhouse, with its roof sloping to the south or south-west, such as may be seen in many of our small villa-gardens; only, instead of having a path in the centre, and a bench on each side for the flower pots to stand on, it has a sunken path, and a border of earth on each side, *on* or in which fruit-trees in pots are to be placed. The preceding rough section (fig. 4) will perhaps convey an idea of this structure and its use; though now almost superseded by other and improved structures, I have preferred to retain a figure of the Orchard-House, pure and simple, as originally thought of.

IMPROVED LEAN-TO ORCHARD HOUSE.

14 feet wide as per sketch.

The cost of erecting a lean-to orchard-house 30 feet long, 14 feet wide, 5 feet high at the eaves, 9 feet high at the back, constructed as shown in sketch, each post standing in an iron socket, including fixing, painting, glazing with 21-ounce glass, expenses to men and carriage to any railway station within 50 miles of London, will amount to 47*l.*

BUILDER'S ESTIMATE.

Given in 1879.

Estimate for an Orchard-House, 30 *feet long,* 12 *feet* 6 *inches wide,* 9 *feet* 6 *inches high at back, and* 5 *feet high in front.*

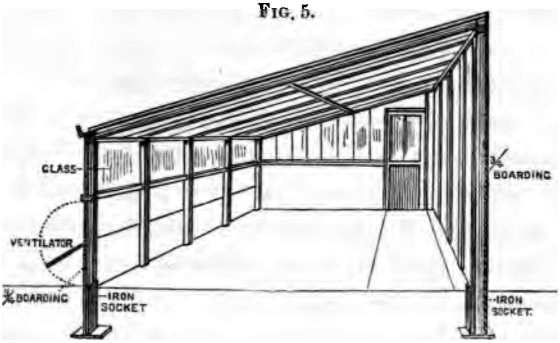
3 feet oak door-cill, 3 by 4.
172 feet 3 by 4½ in. fir for posts, plates, and door-posts.
90 feet 1½ by 4½ in. cill piece all round.

142	feet 2½ by 3½ in. for middle posts at back, end rafters, purlin, and posts to support purlin.	
43	feet superficial 1 in. deal for top and bottom rails and ledges.	
800	feet superficial ¾-in. wrought and beaded matchboards, including door.	
238	feet 1½ by 4 in. rebated and chamfered rafters.	
90	feet superficial oak slab for sunk path.	
180	yards painting two coats with Carson's anti-corrosive paint.	
187	squares, 20 by 15, 21oz. glass with putty and glazing.	
12	pairs Garnet hinges, latch, buttons and nails.	
		£35 10 0

By using larch-poles instead of square timber for the posts, a saving may be effected; by being one's own carpenter, a large saving. If oak be used for posts, unless small oak trees can be bought cheaply, 1*l.* 15*s.* must be added to the above estimate.

The foregoing estimate and sketch are for a cheap lean-to orchard-house standing by itself. Where there is a brick or other wall to serve as a back wall, it may be built against it with a great saving in expense; but as sliding shutters cannot conveniently be let into such walls, ventilators may be made at the top of the slope of the roof by having every alternate square fixed in a wooden frame, which should run in a groove and be

FIG. 5.



Section of the Lean-to Orchard-House.

drawn up and let down with a cord to which an iron weight should be attached to keep the sliding sash in place; with this the ventilators can be regulated at pleasure. An equally or more convenient mode of ventilating at the top of the sloping roof is by a continuous shutter of wood, in 10-feet lengths, on hinges opening upwards, raised by a line and pulley; this should be 1 foot wide at least. In a house not more than 10 feet wide, this mode of ventilating at front and at the top of the roof will do very well; but in lean-to houses of greater width it is necessary to have shutters in the back wall on a level with those in front, so that two currents of air may meet, and 'stir up' all the air in the house.

A house of this kind, built against an old garden wall with a S.W. aspect, is in this neighbourhood. The wall is 12 feet high, and covered with full-grown peach and nectarine trees. The house is 200 feet long and 15 feet wide, 4 feet 6 inches high in front; with front sashes, 5 feet by 3, on pivots, and shutters in the back wall, so as to ventilate thoroughly. The rafters are 4½ by 1½ inches, and fixed 20 inches apart; glass 20 inches by 15, and every alternate square at the top next the wall is framed, and on hinges opening upwards (these should be arranged so as to open all at once with a line and pulley). The path in the centre is 3 feet wide, and on each side, 3 feet from the path, is a row of espalier peaches and nectarines; between the front row and the glass are bushes in pots, so that in one house are three modes of culture. It is also divided into three seasons by partitions of glass, forming three compartments; two of these are fitted with hot-water pipes, and one left without, as in a common orchard-house. In one house forcing is commenced early, so as to have ripe peaches or other fruit in May; the second succeeds it with peaches in June and July; and the third, without heat, gives its crop in August, September, and October: peaches and nectarines are thus in perfection from the middle or end of May till the end of October.

The fruit on the wall is the first to ripen, and is very early, owing to the warm aspect. This is a large and most agreeable lean-to orchard-house; and although 15 feet wide, a house like it can be built at a less cost than the narrow upright houses in front of the walls at Trentham, which are only 5 feet in width.

The lean-to house, whether against a wall or standing alone with its boards for walls, forms a most excellent vinery for grapes not requiring fire heat, such as the Black Hamburg and many other varieties. The vines should be planted inside the front wall and 2½ feet apart, trained under the rafters, 14 inches from the glass, and managed on the spur system, which is the same as that given for the training of grapes in pots. In the south of England the sort above named will never fail to ripen in this kind of vinery. So much do vines love free air, that I have for some years opened my ventilators in the middle of July, and have never closed them till the middle of September. My grapes have invariably been of the finest quality.

In the north of England, Scotland, and Ireland, where it is necessary to economise sun-heat, and to keep out cold winds, lean-to houses with brick walls must be recommended: they may be built with fixed roofs on the same principles as wooden houses, and will doubtless ripen fruit in cool climates more effectually than houses with boards for walls.

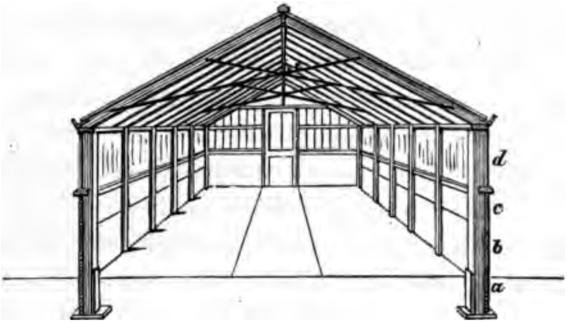
I must add, that no orchard-house should be less than 12 feet wide. Narrow houses are so draughty, that fruit trees seldom succeed in them.

THE

SMALL SPAN-ROOFED ORCHARD-HOUSE.

I NOW give a rough sketch and description of my favourite sort of orchard-house, the span-roofed. In houses of this kind peaches and nectarines do not, perhaps, ripen so early as in lean-to houses, but quite as early as on walls. Owing to their being detached, they can be more thoroughly ventilated, and the fruit from them is generally piquant in flavour.

FIG. 6



A situation cannot be too light and airy for these span-roofed houses. I believe that orchard-houses on Epsom Downs would yield the finest peaches in the world; still they are not ineligible even for low and moist situations, where they always give a comparatively dry climate.

In situations near the sea, or in valleys with a very humid air, or in the cool moist climates of the north, a single 4-inch pipe with hot water, to be kept heated all the blooming season, will be found most beneficial, as dry air prevents the pollen being glued to the anthers, and much facilitates the setting of the fruit. In autumn also it would be useful to hasten the ripening process.

In the north of England and all cold or moist districts, of which England contains too many, in the Highlands, and in the cold stormy climates of the north of either Scotland or Ireland, it will perhaps be quite necessary to introduce hot-water pipes into houses in which peaches, nectarines, and apricots are to be cultivated, not to force them, but to insure their ripening properly. The shoots of such trees also require a dry and warm atmosphere in the autumn, even after the fruit is gathered, or they will not ripen; and consequently they will not put forth vigorous fruit-giving blossoms.

A small span-roofed house is so simple in its character that any self-taught builder or amateur may erect one. The way to do it is as follows:—Two rows of oak posts, 5 inches by 3, and 9 feet long, should be firmly fixed 3 feet in the ground; 6 feet out, 14 feet row from row, and 5 feet apart in the rows. On each of these rows should be firmly nailed a plate, 4 inches by 3, to receive the lower ends of the rafters, which may be nailed on as directed for the lean-to house, p. 5. The rafters should be 8 feet long, and 3 inches by 1½; they can be bought at any saw-mill, planed and chamfered, for 10*s.* or 12*s.* per 100 feet. The ridge-board *e*, in fig. 6, should be 5 inches by 1, to which the upper ends of the two rows of rafters, after being sloped, should be nailed. As the glass cannot be made to fit on the plate at bottom, a drip-board, 5 inches by 1, placed sloping to receive the lower ends of the pieces of glass, must be fixed on the plate the full length of the house. On the ridge-board a small ledge must be nailed, for the upper ends of the pieces of glass to rest on. On the upper edge of the ridge-board a cap 3 inches by 1, shaped thus ∧ should be nailed, to shoot off the water and prevent its entrance at the ridge.

Description of my Small Span-Roofed Orchard-House.

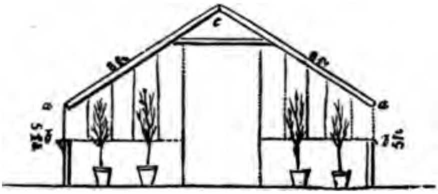
Height at sides, 6 feet; height to ridge, 10 feet; width, 14 feet. The roof rests on oak posts, 5 inches by 3 inches,[1] 5 feet apart (the usual way of building with brick foundations and sills may be employed). It stands north-east and south-west, so that the sun shines all the early part of the day on the south-east side, and in the afternoon on the north-west side.

---

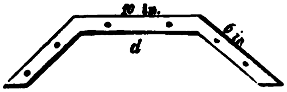
[1] Oak posts of this size, I find, on referring to the wooden tombs in the churchyards, last from 50 to 60 years. Deal posts let into iron sockets are preferable to any other mode of building orchard-houses of wood.

The rafters are 20 inches apart; the roof is glazed with 21-ounce glass, in pieces 20 inches by 15 inches, and a row of glass 18 inches wide (in pieces 20 inches long placed end to end, without putty where they are joined) should be placed on each side under the eave-boards. Under the glass on each side is a ventilating shutter of ¾-inch board, 1 foot wide, on hinges opening downwards.[1] Below this are boards (¾-inch) to the ground. The two ends are glazed down to the lower edges of the glass at the sides. The rafters are 3 inches by 1½ inch, and are tied together at the apex of the roof by a light flat iron tie screwed to every fourth rafter. Besides these ties, and to prevent the posts going out,

FIG. 7.



Section of the small Span-roofed Orchard-House.



a a Glass, 12 inches. *b b* Ventilating shutters, 1 foot. *c* Opening over door. *d* Iron tie screwed to every fourth rafter at apex of the roof.

---

[1] If shutters or sashes on hinges are used as ventilators, they should always open downwards; if suspended over the apertures, they prevent the entrance of the downward current of air.

oaken spurs are fixed underground to every fourth post on each side. These may be dispensed with if deal posts in iron sockets are used. This may seem, in print, a homely structure, for there are no sashes, and the roof is fixed; but it is really light and most cheerful-looking.

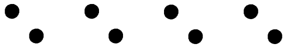
Now, as to ventilation. There are no apertures in the roof, for I have long since found my houses perfectly ventilated without them, and the shutters are 1 foot 6 inches (the lower edges) from the ground. In sunny weather the air in the house, from the great quantity of sunlight admitted by the large pieces of glass, becomes soon rarified; and then the comparatively heavy cool air from without enters below in two continuous currents. This, of course, soon becomes warm and light, and ascends to the apex of the roof rapidly through the leaves and branches of the trees which are placed on, or planted in, each border; for in this description of house the path is two or three feet wide—which may, or may not, be sunk two or three inches, according to choice—is in the centre, and the borders for the trees on each side. It may seem strange that no egress for the heated air should be in the roof, and not quite as it ought to be; but I deal only with the result of much experience, and find that by simply leaving a triangular aperture 9 inches deep close under the gable of the roof over the doorways at each end, no stagnant air ever exists in my houses. These apertures are closed only on frosty nights in the spring, when the trees are in bloom, by a piece of matting; all the rest of the year they are left open. When the sun shines brightly, the heated air rushes out at each end rapidly enough almost to turn a small windmill; the leaves of the trees are all in motion, and no scorching takes place. This low lateral ventilation is so perfect, that in two large houses, 70 feet long and 20 feet wide, the *only* ventilators are shutters 1 foot wide, on each side, about 2 feet 6 inches from the ground. One of these houses is heated by hot water all the summer for the culture of young vines and figs, yet no scorching ever occurs. I have therefore ceased to think roof-ventilation necessary in houses under 30 feet in width.

The great saving effected by substituting fixed rafters for sliding sashes will be apparent. Many horticultural builders have adopted the principle, thereby making a large reduction in the estimates of houses, as compared with those made some few years since. A simple and plain house such as I have described may be built for about 120*l.* When labour was cheaper than it is now, and labourers were less exacting, I built an orchard-house for 50*l.*, of the above dimensions; it may be easily imagined that my home-made house is not ornamental—it still exists, and is perfectly useful.

This cheapness of construction is entirely owing to the simple way in which ventilation is provided for. The borders in a small span-roofed house need not be raised, nor the path be sunk, except as a matter of choice; the expense of a brick edging is thus saved.

The borders should have a dressing of manure and loam, and be well forked over and mixed with the dressing to 6 inches in depth; the surface should then be firmly rammed down.

Two rows of trees may be placed on each border thus[1]—



3 feet from stem to stem, so that the sun may shine on every leaf. This is most essential; for I have occasionally had some of my peaches deficient in flavour, and on examination have always found the trees too much crowded, so as to shade each other. In these small span-roofed houses, the trees placed as above form a charming avenue, and are looked down upon by the cultivator, so that every leaf and fruit is seen.

A very light and elegant small span-roofed house may be built with sashes 2 feet in depth (from the eave-boards) hung on pivots, and beneath the sashes strong 32-ounce glass to the ground, so that roof and sides and ends are all glass. By having strong glass to the ground, instead of brickwork or boards, some extra expense would be incurred, but the effect would be excellent.

---

[1] A house 20 feet long and 14 feet wide will hold 24 trees.

SPAN-ROOFED ORCHARD-HOUSE.

The cost of erecting this house, 50 feet long, 14 feet wide, 5 feet high to the eaves, 9 feet high to ridge, constructed as shown on sketch, each post standing in an iron socket, including fixing, painting, glazing with 21-ounce glass, expenses to men and carriage to any railway station within 50 miles of London, will amount to 66*l.*

THE

LARGE SPAN-ROOFED ORCHARD-HOUSE.

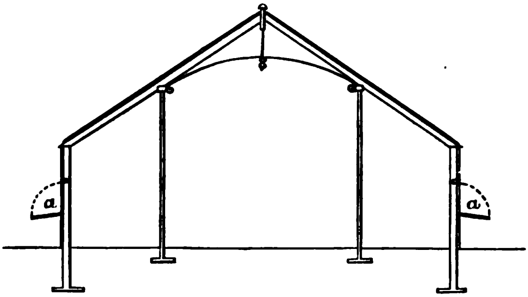
The small span-roofed house will be found an agreeable and economic structure; but large gardens require large houses, and for these the following construction may be confidently recommended:—

A cheap, large, span-roofed house 20 feet wide, and 12 to 13 feet in height to the ridge, may be built after the following manner:—Oak posts,[1] 6 inches by 4, and 9 feet long, should be placed flatwise, so as to stand 5 to 5½ feet clear out of the ground, and the soil well rammed round them; or concrete poured in so that they stand firmly. These posts should stand in two rows, 20 feet apart, 6 feet apart in the rows. On them should be nailed the plates, to receive the end of the rafters, which may be nailed on to them, as recommended for the lean-to house, p. 6. These plates should be 4 inches by 3. The rafters should be 4½ inches by 1½, and nailed to the ridge-board at the apex of the roof, which should be 12 feet from the surface. The ridge-board should be 7 inches by 1½. The rafters must be prepared for glazing in the manner recommended for the lean-to house, p. 7, and placed 20 inches asunder.

---

[1] Deal posts in cast-iron sockets answer admirably.

Fig. 8.



Transverse Section of Orchard House, 24 feet wide.
a Ledged Shutters for Ventilation.

The sides and ends of the house should be formed of ¾-inch boards and glass as shown in plan, and, for ventilation, a shutter, 18 inches wide, made into 15-feet lengths and opening on hinges downwards, the lower edge 18 inches from the ground, should be placed on each side: these are for the admission of cool air. For the egress of the heated air, an aperture 1 foot deep should be made at each end, just under the apex of the roof. To this a shutter on hinges should be fixed, and this should be kept open from the beginning of June till the end of September. The roof should be supported, and kept from going out, either by light 'collar-beams' of wood to every sixth rafter, by iron rods, so disposed as to tie the roof securely, or, best of all, by two rows of iron pillars, formed of 2-inch gas-pipes, which are very cheap, 6 feet from each side; the lower ends placed in the ground, and let into a small square of brickwork and cement, the upper ends let into the purlin. These pillars should be about 10 feet apart.

It will be seen from this description that a house built after this method is a plain but useful structure, for its sides, ends, and doors (there should be one at each end, in the centre) are all of boards, and its roof only of glass. Nevertheless, this description of orchard-house will give fruit in as great abundance, and of as fine a flavour, as a house built ornamentally, and at a great expense.

The cost of a house of this description is about 170*l.* for 100 feet, and 95*l.* for 50 feet.

In a large span-roofed house thus built, there need not be any raised brick beds, but merely a nice well-kept gravel-walk down the centre, about 3 feet or more wide, and the trees (if in pots) placed on the borders on each side, or planted in the borders. The most eligible trees for a house of this size are either low standards with stems of 5½ feet or so in height, or half-standards, with stems about 3 feet in height, planted about 5 feet apart; and as they increase in size, they may, after three or four years, be arranged so as to stand from 6 to 8 feet apart. If it is thought preferable to plant the trees, and allow them to grow without being subjected to either root-pruning or removal, and to be merely kept in check by summer pinching, winter pruning, and a hard rammed surface, they should be planted from 8 to 10 feet apart. The latter mode of planting is adapted to those who cannot or do not wish to devote much time to orchard-house culture. In either case, an orchard of peaches, nectarines, plums, cherries, and a few of the finer sorts of pears and apples, thus planted, under a spacious glass roof, would be found both interesting and profitable.

In June 1860 a house was built here, which for strength, cheapness, and lightness of construction, is both eligible and agreeable (see figs. 9 and 10). It differs from the houses formerly built and recommended, in having no raised brick borders, by which a considerable saving is effected. No inconvenience will arise from the trees standing on the ground level, for it is only necessary to cultivate the trees as pyramids or half-standards, for the central border, and as dwarfs with stems a foot taller than usual for the side borders. It is 100 feet long, 24 feet wide, 12 feet high in the centre, and 5 feet 3 inches at the sides. Sides and ends are glass, and on each side and at both ends is a glazed shutter, 18 inches wide, the lower edge 18 inches from the ground, on edges opening downwards (see fig. 8) for low lateral ventilation, the only perfect mode of ventilating, and below that glass to the ground. At each end, just under the gable of the roof, as in fig. 7, *a*, are openings 3 feet in depth, to which sashes are fixed; these are to be open all the summer, to let off the hot air, and this is all the top ventilation necessary.

FIG. 9.

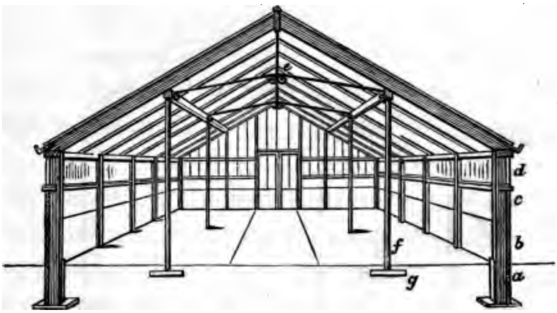
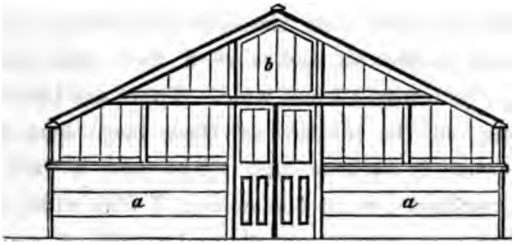


FIG. 10.



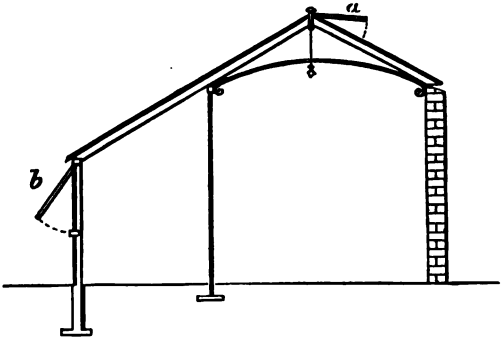
End elevation of an Orchard-House 24 feet wide.

a Glazed shutters on hinges, opening downwards. *b* Sash for egress of heated air, opening downwards.

The roof, which is formed with light rafters

3½ inches by 1½, is supported on each side by seven light iron pillars, 1½ inch in diameter, fixed to a bar of iron, which is let into the rafters. Each row of pillars is 6 feet from the sides of the house, so that there is a border on each side 6 feet wide, and an area in the centre 12 feet wide. There are two modes of laying out the interior of these large span-roofed houses: one is to have two paths and a bed (not raised) marked out in the centre, 7 feet wide, in the centre of which may be planted a row of standard peaches and nectarines with stems from 5 to 6 feet in height, about 5 feet apart. After a few years—say from five to seven—when their branches meet, every alternate tree may be removed. These standards should be partially under summer pinching, as recommended

FIG. 11.



Section of semi-span house 15 feet wide.
a Glazed light hung to ridge for Ventilation, to draw up. *b* Glazed lights hung to plate for Ventilation, to push out.

for dwarf bushes, p. 80; and thus managed, they will bear large quantities of fruit before there will be any occasion to remove the alternate trees. The remaining space of the central border may be occupied with pyramidal trees or half-standards, with stems from 2½ to 3 feet in height, either in pots (which for pyramids is the best mode of culture), or planted in the border. The two side beds may be occupied with bush-trees in pots.

The other mode of laying out a house, from 20 to 30 feet wide, is to have only one path, and that in the centre, and this may be from 3 to 5 feet wide, according to the width of the house. It may be either of fine binding gravel, which forms a dry warm path, and is perhaps the most 'gardenesque,' or, if expense be of no import, paved with Minton tiles. On each side of this central walk, and about 2 feet from its edge, may be planted a row of standard peaches and nectarines, of the height described above, at the same distance apart, and subjected to the same treatment as the trees in the single row above described. They will soon form a beautiful avenue, and a house thus planted will have a charming effect. The remaining space in the borders on each side the row of standards may be occupied with bush-trees, and half-standards, in pots, or planted in the ground at the pleasure of the owner. There is one great source of comfort to the fruit gardener: in a large house an abundant crop is certain, for spring frosts do not penetrate such structures to any injurious extent. If any part of the avenue is formed of standard apricots, they will require more space, and should be planted 8 feet apart. The best variety for this mode of cultivation is the peach apricot, as it is not inclined to make long bare shoots; but even this prolific sort requires to be under rigid summer pinching to make standard trees form compact fruitful heads.

In pruning and summer pinching of standard and half-standard peaches and nectarines planted in the borders of orchard houses, it is of great consequence to make the trees flat-headed, so as to expose as large a surface as possible to the sun: this is done in the winter pruning, by cutting out closely the upright branches, and in spring and summer by rubbing off ('disbudding') all the young shoots inclined to grow upright—in short, to encourage daily all the summer horizontal growth. Standard peaches treated in this way bear bushels of fruit, and rival in production the trellis system which costs the gardeners so much time in tying and training.

There is one thing most necessary to be adhered to in the culture of standard and half-standard peaches under glass—the ground must not be stirred after they are planted. This idea, of course, may be combated by some gardeners. I can only repeat, *let the surface of your house be as solid as a path*, and do not listen to those who advise the contrary.

A few words about the preparation of the borders of an orchard-house before planting will be sufficient. Stir the borders with the fork or spade 20 inches in depth; if the soil be poor, some rotten manure may be mixed with it to that depth. It should rest a fortnight to settle before the trees are planted, and as soon as that operation is finished, ram all the surface firmly, and do not allow it to be shaded by placing too many trees in pots among the standards. If after a few years, from bearing very heavy crops, the trees become a little exhausted, spread on the surface, in March, some of the rich compost recommended for surface-dressing, to about three-fourths of an inch in thickness, and allow the roots to feed upon it, but do not disturb them.

With amateurs it is still an open question whether to plant all the trees required for an orchard-house in the borders, or to cultivate them in pots. After some years of observation, I can safely recommend that a good portion of the trees should be in pots. It is not at all easy to decide this question; but after considerable experience of both systems, I think pot culture best adapted to the wants and pleasure of a private family. For the purpose of fruit growing for market, where quantity and not quality is desired, it is possible that planted out trees produce more fruit, but I do not feel convinced of this.

For some years both modes of culture have been closely watched, and at last I feel that I can give a more decided opinion than I have ever yet done. In large span-roofed houses, *i.e.* houses 18 feet wide and upwards, with a central walk and a broad border on each side, half-standard trees, or trees with stems about 3 feet in height; and standards, or trees with stems from 5 to 5½ feet in height, may be planted in the borders with advantage, the only condition required being solidity of soil. A peach-tree would grow and bear better in the centre of a solid path than in the richest, deepest, and most fertile soil of a kitchen-garden, if light and dry. To illustrate this, I venture to describe the method followed in the cultivation of some tall standard peaches now growing in one of my large orchard-houses; they are now about fifteen years old, and are full of health, vigour, and fruit. But I by no means advise the giving up of pot-culture, its advantages are so great; and, as I now write (March 1879)—some old trees, that have now been cultivated in pots for upwards of twenty-five years, seem as healthy and promising as ever. Among the advantages, not the least are the facility of removing the trees to the open air to retard the fruit, and the convenience of placing trees in vacant places among those planted on the borders. My largest trees are in 18-inch pots; the smallest in 13-inch. Unless for trees of very large size, 15-inch pots will be found a good and convenient size.

The soil on which the house is built is a strong calcareous clay: when the trees were planted this was stirred to the depth of nearly 2 feet, some manure was mixed with it, the trees planted, the earth firmly trodden—and firmly trodden it has remained ever since.

The vigour and fertility of the trees are most remarkable, and they stand in a firm unbroken floor. In March they have a slight surface-dressing of the compost described in p. 66—which prevents the water running off—and are abundantly watered. This is repeated during the spring and summer—once a week in hot weather, and once a fortnight in wet cloudy weather—till the last week in October; no more is given till the first week in March. If the surface be particularly smooth and hard, it is slightly pricked, before giving the first water in spring, with the points of a steel fork. It is good practice to give some fresh surface-dressing in July, when the fruit is swelling; this absorbs moisture and feeds the roots. From three to four or five gallons of water may be given to each tree in sunny weather in summer. A large field of peach and nectarine culture is opened up by this method; not only can peach-trees, as at present, be cultivated so as to produce two or three pecks each, but in houses 30 feet wide, 8 feet high at their sides, and 16 feet high in the centre, large umbrageous trees may be grown, and each tree produce as many bushels.

Cultivators of the soil require a long period to shake off the trammels of routine, but I have no hesitation in saying that one day, ere long, peaches will be sold in much larger quantities than at present by the facilities given by glass cultivation with moderate pruning. Apricots, more particularly the Peach Apricot and the Moor Park, succeed admirably as standard trees planted in borders with a firm surface. My trees, thus cultivated, were last season (1878) breaking down with their load of fruit.

The most perfect method of growing peaches and nectarines in a large span-roofed orchard-house, so as to produce those large peaches one sometimes sees at Marseilles and in other places in the south of France, would be to give the trees root-heat, *i.e.* to plant them in borders heated by hot-water pipes, placed about 2 feet under the surface, as recommended for the 'orange grove,' p. 188. We have as yet but a glimmering idea of what root-heat will do. A good example of the beneficial effects of root-heat occurred in a garden at Brighton. Two Louise Bonne pyramidal pear-trees happened to be growing in the open air, their roots very near to some hot-water pipes placed in the ground to heat a vine-border. The pear-trees in the garden, of the same and various other kinds, all blossomed freely in 1861, but none of them bore fruit except the two trees with their roots in a warm place, and they bore a large crop of very fine fruit.

A house 100 feet by 24 would produce enough choice fruit for a very large family, as from 180 to 200 trees in pots could be cultivated in it.[1] These large span-roofs are far more light and cheap than the ridge and furrow roofs, like those of the great conservatory at Chatsworth and the Crystal Palace. They may be from 24 to 30 feet in width, the roof supported by light iron pillars. The lateral ventilation (see p. 27) will be found quite perfect; only in a house of the last-mentioned width the shutters should be two feet instead of 18 inches deep. The great object is to have a light unbroken roof, without ridges, furrows, and gutters, all of which are rather new, or at least not very old, but all clumsy and unpleasing. In houses where expense is not heeded, the water should be conducted from the roof into a tank or tanks underground, either outside or inside. Rainwater is the best of all to syringe or to water the trees with.

---

[1] In No. 56 of *All the Year Round* for 1860 it is suggested that a few trips to Sawbridgeworth should be made by small market-gardeners and cottagers, 'as it is not enough to *tell* them what *may be* done with orchard-houses: they must be shown what *is* done.' I can only say, that poor and rich, or those neither one nor the other—in short, all who wish to benefit by what they can see and hear, if they

It is essential that these large houses should stand endwise N.E. and S.W., or nearly so; for if placed N.W. and S.E., as some of mine are, owing to the peculiarity of the site, the trees in the north-east border will be too much shaded, and will not ripen their fruit well. I also prefer the same position for small span-roofed houses. The height of the houses described exceeds that given in former editions, but I am inclined to think it more eligible, for it is surprising to see what fine and even large trees can be grown in houses of this size and height.

will make their way to the Harlow Station, on the Eastern Counties Railway, and then to Bonks Hill between Harlow and Sawbridgeworth, may see houses of all kinds, exceeding forty in number, and have all their questions answered.

SPAN-ROOFED ORCHARD-HOUSE,

100 feet long, 24 feet wide, 6 feet high to eaves, 12 feet to ridge.

The cost of erecting this house, constructed as shown on sketch, each post standing in an iron socket, including fixing, painting, glazing with 21-oz. glass, expenses to men, and carriage to any railway station within 50 miles of London, will amount to 196*l.*

ORCHARD-HOUSES AS SANATORIUMS.

(From the *Quarterly Review* for October 1859.)

'STRUCTURES like these are as much for ornament and pleasure as for the cultivation of fruit. The dry air of a spacious orchard-house is most agreeable in the autumn, winter, and spring months for invalids. An hour's sunshine sends the air up to 60°. Early spring and winter-blossoming shrubs may be introduced, but not evergreens; for to keep the latter in health they must be liberally watered, and this destroys the elasticity and dryness of the air, which makes it so agreeable to breathe. Some plants of *Chimonanthus fragrans*, in large pots, will give their sweet flowers in January. *Jasminum nudiflorum* and the *Forsythias*, although quite leafless when in bloom, have a gay appearance. Banksian roses, Mezereons, the early Dutch honeysuckle, the different varieties of *Magnolia conspicua*, the Moutan pæonies, and many other plants, may be grown in pots, and will bloom freely from January to April, with only a small quantity of water.

'In such dry and sunny counties as Surrey and Hampshire, orchard-house sanatoriums will one day be formed, and a fine dry air will be secured, more healthy and grateful than can be found in Continental Europe —the air of Nice without its cutting winds.'

Since the above was written, I have annually been struck with its truth—so pure and health-giving is the dry air of large orchard-houses. In addition to the shrubs mentioned in the above extract, I have for two or three seasons past introduced large (11-inch) pots planted thickly with spring-flowering bulbs and anemones, which have given a foretaste of spring in February.

I can with truth state that the advantages of large glass-roofed houses as places of resort for active exercise in unfavourable weather, by ladies and persons in delicate health, are not yet half so familiar as they should be.

Slow, slow are thy ways, O progress!

When sanatoriums are fully established, people will wonder how they could have existed in England without such places; so dry and health-giving is the air of large glass-roofed houses in autumn, winter, and spring, when no plants requiring heat and moisture are cultivated in them. For my own part, I would submit to walk in a house without a tree or shrub in it, merely for a promenade in bad weather, rather than not have one.

PORTABLE ORCHARD-HOUSES.

In gardens rented by their occupiers, it is still almost an open question if structures of glass, such as green-houses or orchard-houses, if fixed, can be removed by the tenant at the expiration of his agreement or lease, unless it be specially provided for in a document of that description. Hence arises the want of a house that may be removed without any infringement of a landlord's rights. I can point out a very simple mode of erecting one. Cast-iron sockets, 4 inches by 3 inside, and 2 feet in length, with 3-inch flanges at the lower end, should be let into the ground, so as to stand 6 inches above the surface, and firmly rammed, or concrete placed round them, to keep them in their places. In these posts (5 inches by 3) should be fitted, so as to leave a shoulder of ½ an inch on each side to support the posts, which are let into the sockets about 1 foot, and are, as it were, suspended in them, as they are left hollow. These posts should be placed with their broadest surface parallel with the house, or flat-wise. When thus fitted into the iron sockets, they require no cement to fasten them, but some thick paint—white-lead and oil, may be placed inside the iron socket, before the post is let into it; this will make it more firm. When a house is to be removed, the posts may be drawn out and the sockets left, so that no ground is broken. The employment of cast-iron sockets, which are not expensive, may be recommended, not only for portable houses, but for those that are intended to stand permanently; for where oak is scarce, fir-timber posts may be employed. They will stand perfectly dry in the sockets, and last as long as the rafters. There is no method of building orchard-houses so simple or so cheap as the employment of neat bevelled posts for the sides; and the above method will be found of great advantage to those who prefer, as a measure of economy, a *home-made house.* It must be recollected that in building a portable span-roofed house, the plates, rafters, &c., should be screwed on so as to be easily unfixed: not a nail should be used.

A lean-to house erected here is perhaps worthy of description, as it may point out to readers the cheapness and usefulness of such structures. It is 430 feet long, 14 feet wide, 9 feet high at back, 4½ feet high in front;[1] the posts are of fir, 5 inches by 3, placed 6 feet apart and let into iron sockets as described p. 34; the rafters are 4½ by 1½ inches, placed 24 inches apart, and tied together by a band of T-iron, screwed to the under side of each rafter: this keeps them from sagging or warping. The back wall is formed of ¾-inch boards nailed to the posts (painted stone-colour), so as to give an unbroken surface, to which peach and nectarine trees, trained as diagonal or fan-shaped trees, give a most agreeable aspect. As the boards after some little time shrink, it is good practice, to make the wall firm, to line the outside with ½-inch boards from the top to within four feet of the bottom. The crevices there may be left for the admission of air, or closed as convenient. The 14 feet wide area inside the house may be planted with vines trained *à la* 'vineyard under glass,' or potted trees may be grown in it, or early vegetables, or tender shrubs protected in winter; in short, there is no end to the usefulness of an area covered with a glass roof. The great and leading idea must be to keep the roof clear, unless it be devoted to vines. The cost of a house built after the model of the above-mentioned will be moderate, but it must be remembered that it is considered and arranged for utility only; consequently no money is spent on any ornament. Most builders would probably consider the structure too roughly put together for skilled workmen. It has, however, answered its purpose effectually, and the work has every appearance of lasting some years longer.

---

[1] It should be 10 to 11 feet high at back, and 5 to 6 feet in front.

I now give the prices I have paid for materials for my house—they have been bought at the steam saw-mills now so common. Fir posts 5 inches by 4, unplaned, 3*d.* per lineal foot. Rafters 4½ by 1½ inches, planed and chamfered, 2*d.* per foot. Plates 5 by 3 inches, unplaned 2½*d.* per foot. ¾-inch boards, planed on one side, 12*s.* per 100 feet. Iron sockets as described p. 38, 5*s.* each. T-iron, 2*d.* per foot. 21-oz. glass, 3*d.* per foot. On estimating the cost of these articles, I find that sufficient for a house 100 feet long and 14 feet wide may be bought for something under 45*l.*; there will then be the front, 2 feet glass and 2½ feet boards, at a cost of 3*l.* 10*s.* The two ends are not calculated for in the above; they may be closed with boards, or glass, or nets, at the pleasure of the builder; but it is evident that a lean-to portable house, 100 feet long and 14 feet wide, may be neatly built, glazed (the large glass makes glazing cheap), and painted for 70*l.* to 80*l.* This is a very low estimate, and I counsel those who wish for plenty of room, and have no money to spare, to build their own houses ; the method I have pointed out is the cheapest of all. The possibility of using cheap fir posts without fear of rot is a boon, and some credit may be taken for the invention of post-sockets and portable houses. I may, I trust, be allowed to hint that these sockets may be used for posts to fences of wood, and thus comparatively useless home-grown timber may be made very useful.

To prevent birds from injuring fruit on the trees removed to the open air, a wire netted structure should be added to the orchard-house. This need not be expensive, but a simple framework covered with wire rabbit netting with a small mesh ; it is most annoying to see fine fruit, especially pears, when ready for gathering, punctured at the stalk. Tom-tits are the great sinners. The pear so injured is quite unfit for keeping; and the birds do not confine themselves to autumnal fruits, but take pieces out of the winter sorts, no matter how hard the flesh be.

GENERAL CULTURE.

Many gardeners have asserted that peaches and nectarines from bushes and pyramids are inferior in flavour to those grown on trellises in peach-houses; and that more fruit could be produced in the same space by the latter mode. I can easily imagine a partial failure in flavour; not owing, however, to the system, but to the management. The trees alluded to have not had room or air enough, and consequently the fruit has not been high-flavoured. I have had Noblesse and other peaches of the most delicious flavour from bushes in a pot standing in the full sunshine of one of my houses, while those from trees partially shaded were not good. Care should therefore be taken to insulate the trees, so that sunshine and air bathe every fruit and leaf.

The peach-house trellis system is not adapted for small gardens; one tree, or at most two, will cover the roof of a house 20 feet by 12; and nothing can be grown under them. Besides this, three or four years must elapse before they commence to bear to any extent; and, above all, it will require a good gardener to train and prune them, for no amateur could bear the fatigue of constantly keeping his eyes to the sun.

Since the foregoing pages were written, 'crystal palaces' have been built. I have written for more humble gardens; but large orchard-houses may be erected 25 to 30 feet wide, and thoroughly ventilated laterally, so as to give piquant flavour to the fruit. One of these large houses, well furnished with peaches, nectarines, apricots, plums, cherries, pears and figs, and treated as recommended for all other orchard-house trees, would realise an Eastern garden, and bring to mind one of the fruit gardens of Damascus, so vividly described by travellers. In short, I know of nothing in gardening more capable of fully gratifying the senses of sight and taste. Thus, in large places, in lieu of a cheap and simple orchard-house, a fruit conservatory heated by hot-water pipes may be built, and the trees grown in ornamental vases, placed on elevated beds. A few tea-scented and other delicate roses, and spring-flowering bulbs, planted in the borders, would make them gay, and have a pretty effect. It must, however, be recollected, that but very few of what are called conservatory plants can be planted in a common orchard-house; neither can bedding plants be preserved in it, unless the pots are laid down and covered in frosty weather with a painted table-cover and hay; for it is necessary that it should be cold and dry in winter to give the fruit trees their rest. If fire-heat be used, it must only be applied early in spring, towards the end of February—to force the fruit, if early fruit be required; and not in winter, as in green-houses, to keep out the frost. The most severe frost will not injure tea-scented roses or bulbs, if the house be kept perfectly dry after October.

Orange, lemon trees, and camellias may be grown in pots in any common orchard-house without fire-heat, by the very simple method—and how simple are all good gardening practices!—of taking advantage of earth-heat (terrestrial radiation), which is done by laying the pots on their sides on the earth-borders of the house in November or December, at the approach of severe frost, and covering pots and trees with a common painted table-cover, costing about sixpence per yard, and then with a coating, say one foot thick, of dry hay or straw, giving the plants some water before they are laid down.[1] If the weather should be mild in the winter months, as it often is, the covering, which is easily removed, may be taken off, and replaced as soon as frost approaches, and suffered to remain on even if the frost lasts some weeks. About the first week in March, if the weather be mild, the camellias may be placed upright and have water, as their flower-buds will be swelling; they will then bloom all through April; some of their flower-buds may perhaps drop off but not to any extent, for the plants will be in a better condition than they often are after being wintered in a green-house exposed to heat, necessary to keep out frost, and consequently to a dry atmosphere.

---

[1] Towards the end of December 1861, some Tangierine orange-trees and camellias were laid down in one of my large span-roofed houses, on the surface of the central border. These were covered with a piece of the table-covering and some dry hay placed on it about a foot thick. They remained covered till early in February, or about six weeks; on the covers being removed, they were in the most perfect health, and more fresh and green than those in houses from which the frost was kept out by fire-heat. Not a camellia bud has dropped.

A thermometer placed in the ground among the trees registered 33°; while one suspended in the house registered 21°.

Towards the end of the month of March, or earlier if the season be mild, the orange and lemon trees may be placed upright, and have water, which should be given sparingly the first fortnight. They will then blossom and bear their fruit in the house all the summer and autumn. If any sudden severe frost should occur in March or early in April, all the trees must be promptly laid down and covered till it has passed. The radiation of heat from the earth is so gentle and constant, that when thus intercepted by a thick dry covering, no fear of injury even from the most severe frost need be apprehended. I write with confidence on this subject, having for many years kept tender evergreens in pots from frost, by merely laying them down on the soil in the open air and covering them with mats. The application of the system to orange-trees in orchard-houses, is, however, a new idea, and was brought to mind by the following incident:—

On December 19, 1860, the frost became severe, and some young lemon-trees for stocks, which it was thought would not be wanted, and therefore not housed, yet too valuable to be thrown away, were covered with mats two or three thick, and then with a coating of straw. On the 21st there was a considerable fall of snow; they were forgotten, and not uncovered till the middle of February. On taking off the mats and straw, the leaves of the greater part were found to be discoloured, but their stems and roots all alive and fresh, although they had been in moisture and darkness for two months, and lying on a cold, clayey soil fully exposed to the north-east. Lemons and oranges may, therefore, be grown in pots, not only in cold orchard-houses, but also trained to walls with southern aspects, the pots being plunged and taken up annually early in November, then laid on the surface in a shallow trench at the foot of the wall, and parallel to it, and covered with mats and straw in frosty weather, uncovering them during the winter in continuous mild weather. About the first week in May, unless the season be unusually late and cold, the trees may be raised and trained to the wall, the pots being plunged as in the preceding season, following the same practice annually. I have found the painted table-covers answer remarkably well, as they arrest radiation effectually; so that full advantage is taken of earth-heat, hitherto so little thought of, although well known to exist.

Returning to the culture of fruit-trees in orchard-houses, it is very possible that some people may say, "Why not always plant the trees in the borders, rather than in pots?' They may be so planted, as I have elsewhere stated, but there is much to be said in favour of pot-culture. In pots, the size and growth of the tree may be regulated with the greatest nicety; the annual root-pruning, summer-pinching, and surface-dressing can be done with so much facility. Indeed, as far as my experience has gone, I can honestly recommend pots, vases, or boxes for fruit-trees in orchard-houses or fruit conservatories. In the 'Gardener's Magazine' (vol. ii. p. 278), peach-trees are mentioned as having been in pots twenty-years without being repotted: they had been kept in health and fruitfulness by top-dressing only.

They have now been grown here for twenty-five years in the same pot; these veterans are this year (1879) full of health, vigour, and fruitfulness.

With respect to the flavour of peaches and nectarines from pots, it is to a certain extent at the command of the cultivator. The utmost piquancy is given to the fruit by placing the tree in the open air when the fruit is on the point of ripening. I am tempted to give the following paragraph from the note of a 'Country Parson,' who is a great lover of fruit-culture :—

'As regards peaches, few persons have had better opportunities of tasting them in perfection than I have; but certainly the best peaches I ever tasted were from trees in pots placed out of doors when the fruit was on the point of ripening, in front of a wall with a south-east aspect, and about two feet from it.'

Peach and nectarine trees planted in the borders of an orchard-house, either as standards or half-standards, will, however, give great satisfaction, particularly to the amateur who is his own gardener.

In large orchard-houses, standards of peach, nectarine, and apricot trees may be grown with great advantage; they should be planted in the borders, and the soil made very firm about their roots;[1] in winter, from the end of October till the end of February, water should be withheld, and the border not dug in spring, but remain in its firm undug state from year to year. If the soil be naturally poor, some rich surface-dressing should be placed round the stem in a circle 2 feet in diameter, to retain water and prevent its running off the hard soil, and water given to the trees once a week during the summer.

Standards and half-standards—the former 5 to 6 feet in height, the latter from 3 to 4 feet — are more eligible for planting in the borders of large orchard-houses than pyramids, as the latter so soon lose their lower branches: in pots they are not liable to this disfigurement.

An orchard-house in the warm districts in the south of England may be made to hold double the number of trees in pots it would under the usual mode of culture, by the very simple method of removing half the number of peaches, nectarines, and apricots in pots to the open air about the middle of June, to ripen their fruit: this mode is practised by a friend in Sussex with great success. It is not until after the middle of June that such trees fully develop their leaves and young shoots, so that the trees may be placed very near to each other in the house. The trees placed out of doors will ripen their fruit three weeks or so after those in the house, and thus give a nice successional crop.

---

[1] In the calcareous sandy loams peculiar to this district, I find that the soil cannot be too firm for all kinds of stone fruits, whether in pots or planted in the borders; in the latter case, the soil around my trees is as solid as a well-trodden path.—See p. 30.

The system of placing trees on portable trucks, invented by the Rev. Mr. Fountayne, of Thetford, Norfolk, enables the cultivator to give his trees an airing. During warm and sunny weather the trees may be put out of doors. A truck load of ripe fruit trees brought to the breakfast room every morning will most certainly be a very popular innovation; the truck placed in a suitable place must have a very pretty effect Apricots, peaches, and nectarines will furnish a succession of fruit for three or four months.

Size of Pots

In potting trees for this description of culture, pots of different sizes may be used. If large trees for large houses are required, 18-inch pots (18 inches in diameter and 18 inches deep) will be necessary; for moderate-sized trees, 13 and 15-inch pots: these, on the whole, are very eligible sizes. For smaller compact bushes, 11-inch pots are convenient, as they are not unwieldy, and the trees may be made ornaments of the sideboard in the dining-room; and beautiful objects they are when full of fruit. Miniature, yet fruitful, peach and nectarine trees may be grown in very small pots, for I have some not more than 9 inches high, in 8-inch pots, full of blossom-buds.

In remote places, where large pots are difficult to be procured, tubs like those used for orange-trees, or more properly boxes, may be employed with success, and for trees of large size—*i.e.* when they are from ten to fifteen years old—they will probably be absolutely necessary. They are easily made: boards an inch thick, either of oak or deal, should be firmly nailed together so as to form a box 15 inches deep and 20 to 24 inches square; the bottom should be formed with bars an inch thick, placed about half an inch asunder, to allow the roots to penetrate into the borders, and to give thorough drainage.

Compost.

The best compost for all kinds of fruit-trees in pots is the top spit of a pasture with a tenacious loamy soil, or the same kind of loam from a ploughed field; this should be dug and exposed to the air for two or three months in the summer, and is then fit for use. Minute and careful inspection must be made of the soil, all larvæ of the cockchafer must be destroyed if present, and all beetles.

Two-thirds of this loam, with one-third of rotten manure, should be chopped up (not sifted) and well mixed. If it contains a large portion of lumps as big as an egg, so much the better. If only a light sandy loam can be procured, as is the case in some districts, the same proportions may be used; but the ramming-down of the compost must be firmer—in fact it should be regularly pounded with a heavy blunt stick. I have reason to believe that more failures have taken place in the pot-culture of fruit-trees from the soil being too loose than from any other cause.

The above paragraphs have stood some years in print, and as far as they go the directions are sound. I have, however, gathered an idea with regard to compost which may be useful to amateurs, and which the experience of many seasons has confirmed. In other words, I have for some time suspected that which I now know, viz., the necessity of calcareous matter in all composts used in the cultivation of stone-fruits. Many orchard-house amateurs have for several seasons felt surprise at the robust healthy appearance of the apricot trees cultivated here in pots, and their extreme fertility. I had been so accustomed to perfect success in their culture that I felt no surprise, thinking it a matter of course, and scarcely crediting accounts I heard of their failure with some cultivators.

On a careful examination of the soil, particularly the loam used in potting fruit-trees, I found it to be, like all the soils in this district, full of finely comminuted chalk; and to this large preponderance in our sands and loams, amounting in the former to 25 per cent., is owing a part of the great success which attends the cultivation of orchard-house fruits here.

The question is, can this calcareous nature be given to composts used in the cultivation of fruit-trees in pots or in prepared borders? I believe it may, and with but little difficulty. It is merely procuring chalk from the districts where it exists. It is very cheap: a truck-load being easily dug and placed on the rail. This will, of course, be sent in lumps; all the preparation it requires is being reduced to powder, and half a peck of it mixed with a bushel of compost thought to require it. Or if we say, mix two bushels of powdered chalk to a one horse load (twenty bushels) of compost, it will be near enough.

I believe this addition of chalk to compost not calcareous, and to loams of a ferruginous nature, to be quite necessary in the culture of stone-fruits; and if not necessary, still most beneficial to all kinds of fruit trees.

The fine cherries on pyramids, in pots, grafted on the Cerasus Mahaleb, now cultivated here, and the great success of plum-culture, are owing to the calcareous soil; and I recommend chalk to be used in cases where it is at all come-at-able.

APRICOTS.

APRICOTS in pots are very rarely seen, even in large establishments; they are difficult to force, as they will not bear the confined air of a forcing-house. I remember, some years since, being much struck with some apricots cultivated as dwarf trees in the south of France; the trees, full of their golden fruit, looked so beautiful, that I wished that our climate would allow us to grow them in the same way. I had not then thought of cheap glass, root-pruning, and pot-culture.

It must always be borne in mind that, without abundance of air and the full light of an unshaded roof,[1] fruit of high flavour cannot be grown; the trees will bear well, but their fruit will be vapid and flavourless.

Many gardeners and amateurs have failed, to a certain extent, in the culture of apricots in orchard-houses, owing to the trees not having air enough when they are in bloom. This is a great mistake, and the effect of the old-fashioned idea that a dry cold wind blowing through the house must injure the blossoms. If such cultivators could visit the south of France in March, when apricots and almond-trees are in full bloom, and the 'bise,' or north wind, blowing without injury to the blossoms, they would not fear any evil effects from a cold dry March wind blowing through the department of the orchard-house in which apricot and almond trees are placed.[1] It is so well known a truth that all stone-fruits flourish best in climates dry and cold in winter and early spring, and dry and hot in autumn, that it seems like dame-school teaching to mention it here. There is no fruit equal, in my opinion, to a fine peach-apricot ripened in an orchard-house: when slightly shrivelled at the stalk, it is a bag of the most delicious and refreshing syrup.

---

[1] In sunny climates in the south of England, if it be thought desirable to train a few vines under the roof of an orchard-house, they should be at least twelve feet apart, and pruned closely on the spur-system, so as to give as little shade as possible.

The best trees for pot-culture are such as have been in pots one or two years: if these can be purchased, so much the better. The next best are trees that have been removed and cut down one year in the nursery. If neither of the above can be found, 'dwarf maiden trees'[2] will do. Trees taken from the open ground must not be potted till the end of October. Presuming that potted trees have been procured, they may, early in October (or, if omitted then, in November or December), be re-potted into pots of the size selected for this system. I have named 11-inch pots, because they are portable, and the trees may then be shifted into large pots as they advance in growth; 11-inch pots will, at at any rate, do well to commence with. October, November, and December are the best months for potting trees; they may indeed be potted till March, but then no fruit must be expected the first season. If fruit-bearing trees grown in pots have been procured, they cannot be potted too early in October.

---

[1] It is the still hoarfrosts that are so fatal to the well-doing of fruit blossoms out of doors, not dry cold winds. In orchard-houses, stagnant humid air is equally fatal.

[2] This is a term applied by nurserymen to trees one year old from the bud or graft.

In potting a tree place at the bottom of the pot four or five large pieces of broken pots. Cover these with some of the most lumpy part of your compost; then put in your tree, not too deep, but so that the upper parts of its roots are a little below the rim of the pot: if it has a ball of earth, loosen it. Fill up with compost; ram the earth down firmly, as you fill, with a stout blunt-pointed stick. Place it on the border where it is to grow during the summer; give it two or three gallons of water, with a top-dressing of some manure to lie loosely on the surface, and the operation is finished.

Fruit-trees of all kinds may be potted in autumn; and if the orchard-house is not ready for them, they may be kept in any shed till the beginning of February, covering the pots thickly with litter, to keep the roots from being injured by severe frosts.

If the soil over which the house is built be dry and sandy, the pots (this applies to all kinds of fruit-trees) may be plunged two-thirds of their depth; this saves much watering. They must, however, be lifted as directed in Calendar (p. 216).

Trees in pots, placed on the surface, will require in hot weather from one to two gallons of water each, once a day. In cool cloudy weather this quantity may be given about twice a week.

We will suppose that our tree, a nice dwarf bush, with five, six, or seven branches,[1] is potted. It may rest till February, and then be pruned: a pleasant simple operation, the performance of which is more easily shown than described. I may as well now state, that the pruning recommended here for apricots will serve for all bush fruit-trees under orchard-house culture, except peaches, nectarines, and figs. Each branch must be shortened with a sharp knife to ten inches: these shortened branches will form the foundation of a nice regularly shaped bush. In May each branch will put forth three or four shoots: all of these but the topmost one, as soon as they have made seven to nine leaves, must be pinched off to five or seven full-sized leaves of their bases: bloom buds will be formed from the base of the shoot to the point of the pinching, and the year's work, as far as the shoot is concerned, will be done. The shoots produced from the terminal buds of those that have undergone pinching will require regulating, to prevent any one shoot taking an undue lead, but incessant pinching is not necessary, unless a very dwarf plant is required. There is no doubt that incessant pinching weakens the vigour of the tree, as the shoots produced are weaker at each stage of growth.

---

[1] If a tree with only three or four branches is potted, they must be cut in to four inches; and the tree must have a season's growth to form itself.

The leading shoots, which will make vigorous growth, should have their tops pinched off to seven leaves when they have made nine or ten leaves. The summer is past; the month of October is with us. The tree has ceased to grow; its shoots are ripe; it must be put to rest for the winter by lifting up the pot, and cutting off closely every root that has made its way into the border: it is then ready for its top-dressing, the method of giving which I shall describe further on.

The second season:—In February, or early in March, the leading shoot made the preceding year, and which ought to be from two to three feet long, must be shortened to ten inches, and the young shoots, as they push forth in summer, be treated as in the first season. The third season:—As the tree will have increased in size, its leading shoots may be shortened to six inches, and as it becomes aged and fruitful, annually to four inches, and at last pinched off in summer to two inches, so as to make a compact round bush.

In the course of time some of the shoots in the centre of the tree will require thinning out with the knife, if at all crowded.

A more simple mode of pruning even than that above given, is to purchase a bush apricot of two or three years' growth, and during the spring and summer to pinch *every shoot* to five full-sized leaves as soon as it has made six or seven, exactly as recommended for pyramids (p. 68). Trees thus treated increase slowly in size, but they form compact and most fruitful bushes.

This simple mode of pruning, which even a lady may find pleasure in carrying out, does away with one great difficulty in orchard-house culture—that of a spring pruning, always so difficult to teach. I recommend the shoots being pinched back to five or seven leaves (not counting the two or three small leaves at the base of the shoot) instead of three, as in bush peaches, because the buds of apricots are so close together.

The general management of the trees the second year should be as follows:—

February is with us, and, if the season be mild, buds are beginning to swell, and flowers to expand; the trees in your orchard-house are, however, dry and stagnant. Place them in their stations, three feet stem from stem; give each of them a small quantity, say, a quart, of water—not, however, if the frost be severe; let them rest three days, then give them two quarts each; in short, gradually saturate the earth in the pots, and when the trees are in full bloom, make holes in the centre of the earth in the pots with a pointed iron rod, and give each tree two gallons; afterwards water them regularly according to the state of the weather. The buds, if the weather be mild, will soon begin to swell, and in March, or early in April if the season be late, they will put forth their full bloom; and beautiful things they are, for no frosts, no storms, will destroy the blossoms. If the weather be sunny, with sharp frost at night, as is often the case in early spring, the shutters, both back and front, may be opened all day and closed at night: if a wind-frost and cloudy weather, they may be closed day and night; the ventilation through the joints of the boards will then be amply sufficient. With this treatment nearly every blossom will set.

From recent experience, I find that apricot-trees are not liable to the red-spider, and the fruit seems to like a dry warm climate; they therefore require syringing but once a week, as too much syringing brings on black spots on the surface of the fruit, causing decay. Weak liquid manure may be given once a week during the summer. This is, however, almost a matter of choice. My trees grow and bear well without it. Guano-water, one pound to twelve gallons, is perhaps as good as any; and a good soaking of this once a week is better than using it more frequently. While in their young state, the fruit must be thinned, leaving, at first, upon a bush that has been two years in a pot, about three dozen; which, when they attain the size of a small nutmeg, must be reduced to 12 or 18.[1] The third year, a tree, if it has prospered, will be able to bring two dozen to maturity; it is, however, better to have a few finely-grown fruit than many that are small. If some of the trees are required to decorate the dessert they may be made ready for removal by lifting the pots, to keep the roots from running too deeply into the border. This is best done about four times in the course of the summer—say, June 10 and 25, July 10 and 25. The young roots are thus broken off, and arrested in their progress downwards. From recent practice it has proved better to feed pot-trees (exclusively grown as such) on the surface of the soil than to allow their roots to penetrate into the border. Trees that have been used to ornament the dessert should be replaced in the orchard-house after the fruit is gathered and have water till the end of October.

---

[1] Instead of pulling off the fruit, which often lacerates the bark, they should be cut off with the point of a sharp penknife.

A curious fact relative to the culture of the apricot in orchard-houses is a discovery that they require less care than any other kind of fruit; it is simply the 'let alone' principle and the absence of too much care. Their successful culture in pots is soon told. Trees of three or four years' growth should be planted in pots 15 or 18 inches in diameter, in a compost of loam and manure; if the loam is not calcareous, the same proportion of chalk (one-tenth) as recommended for peaches and nectarines should be mixed with it. The compost should be rammed down firmly, but not too heavily —the blunt end of a stout stick will do very well. The trees should have no water after the middle of November till early in March, just as the blossom buds are swelling, and then must have it only in small quantities.

As soon as the fruit is set, and about the size of small horse-beans, some rich dressing should be placed on the surface of the soil in the pots, and water given liberally; this treatment is adapted for trees potted in autumn. For trees established in pots, the following simple treatment has been found here perfectly successful. About the first week in November they should have a liberal supply of water; this cannot be given at once, but should be supplied at intervals—say three times during one day; this is the last time of watering, and it should be done effectually. No top-dressing, as with peaches and nectarines, should take place, but the earth in the pots should be suffered to remain firm and undisturbed. About the first week in March, when the blossom buds begin to swell, the trees may have water, as directed for trees freshly potted; but now comes the peculiar treatment which has here been so successful: the surface of the soil must remain perfectly undisturbed until the fruit is fully set, and about the size of a small horse-bean; then, and not till then, should the tree have fresh food to nourish its crop of fruit—and this is done by carefully scraping off the surface soil with the inert fibrous roots to an inch or two in depth, so as not to injure the larger roots, and then placing on the surface a dressing of the rich compost named; this should not be heaped up to the stem, but should be made concave, so as to retain water. The dressing should be 3 inches deep round the outside of the circle; if the weather be warm, the trees may have water daily, and the fruit will swell rapidly. I must add, that this surface-dressing given, say early in May, must be repeated in June, and again in July; for the roots seem, as it were, to feed upon it—at any rate, it disappears. If a tree should happen to have an extra full crop, it is a good practice to stick some pieces of slate inside the rim of the pot, so that more food, in the shape of an additional coat of compost, may be given; this is, however, not to be recommended—it is better to thin the fruit more severely, so as not to distress the tree. It will be necessary to pinch all the young shoots during the summer to six or seven leaves.

The rich compost referred to for surface-dressing, in spring and summer, is composed of horse-droppings from the roads, two-thirds, and one-third of kiln-dust thrown into a bed 1 foot deep, and saturated with strong liquid manure from the cesspool. The day after mixing and saturation it is fit for use. Its smell is at first disagreeable, but a bottle of Burnett's disinfecting fluid soon puts a stop to this unpleasant matter. I have never seen any surface-dressing equal to this in its effect; it produces almost a magical growth in trees. If there be any difficulty in procuring horse-droppings, the rotten manure from an old hot-bed finely chopped and mixed with an equal quantity of malt or kiln-dust, makes an excellent surface-dressing. Or in default of kiln-dust,[1] finely-chopped rotten manure saturated with liquid manure will answer well. The summer surface-dressings should never be of coarse manure; they should always be finely chopped. This treatment may be continued every year without variation.

---

[1] In malt houses kiln-dust is gathered from the floor under the malt-kiln, and consists of the light ashes from the furnace mixed with malt combs, which are carbonised; it differs widely from pure malt combs, which are used for feeding cattle.

There is a method of feeding trees in pots, which I have lately practised—feeding from above only. To do this, two bricks should be placed parallel to each other, and 6 inches apart; on these the pots should be placed, so that the water given to the tree may run off freely. A pot standing thus has the warm air of the house under it, as well as round its sides. The effect is very remarkable; for if the tree has frequent surface-dressings, the water, which may be more freely given than when it stands on the ground, carries down the rich food very rapidly, and very fine fruit will be produced. Peach and nectarine trees, with leaves inclined to be yellow from having had too much water, should be thus treated. By this method the trouble of lifting the trees in June and July is spared; but more water is required, and so the trouble is about equal. It will be necessary in very dry winters to watch the trees to see if their shoots shrivel; if so, they must have a small quantity of water, but not in severe frost; and if the winter be severe, to 'make assurance doubly sure,' some dry hay or litter may be laid on and around the pots, so as to make the roots perfectly safe from the effects of severe frost.

Now let us see what we may expect from this treatment. The apricot, as is well known, comes from the East. We will take Persia or Armenia. The winter there is dry and very severe; the spring dry, with hot sun and piercing wind, just when apricots are in full bloom; and yet how they succeed! Let anyone go into an orchard-house when we have our usual March weather: the wind will whistle through it, and the climate will be dry, sunny, and bracing; the blossoms, under these circumstances, will all set. Unfortunately, we cannot command sunshine enough to carry us along, to make our fruit ripen in May and June, as in warmer climates; we must, therefore, wait patiently, for our orchard-house climate is slow but sure in its operations. If the above directions are followed, Eastern nature is imitated as closely as our cloudy skies permit. The trees bloom in a dry airy place; they pass through a comparatively dry warm summer; they are, like all trees natives of dry climates, early in a state of perfect rest, which is continued all through the winter, and thus they form healthy shoots and well-developed blossom-buds. Nothing in culture can be more perfect, and all is so simple, that, knowing as I do with what facility it is performed, I regret being obliged to use so many words in describing it.

It will be seen that I have, to carry out this system, recommended houses of wood and glass; those, however, who prefer brick to wooden walls, may have them; as any green-house can be made into an orchard-house by merely lowering the roof to the height given in page 5, and having sliding shutters back and front. The grand essentials are, for a small orchard-house, a roof not too lofty, borders instead of benches, and constant lateral ventilation, more or less, according to the state of the weather, through the shutters; but in houses with brick walls there will not be that constant gentle percolation of air which there is through boarded houses, and which in the south of England is so highly favourable to the well-being of stone-fruits.

The trees in pots should be placed on the borders, back and front, 3 feet apart stem from stem. A large span-roofed house 100 feet long and 24 feet wide, with a path 5 feet wide in the centre, will hold about 180 trees in pots, or 36 trees to every 20 feet in length. A house 20 feet by 14 will thus hold 24 trees. Twenty-four trees will give from sixty to seventy dozen of fruit when in full bearing. A small bush of the Pitmaston orange-nectarine, four years old, produced one season four dozen of fruit, and brought them all to perfection: still this is too many, as some of the fruit were small. I mention this merely to show what can and may be done by this very interesting mode of cultivation, which, to sum up, is as follows:—Surface-dressing in summer, annual summer pruning by pinching, and autumnal or spring pruning.

There are, I well know, some amateur as well as professional gardeners who object to the pot-culture of apricots; to such I can with confidence recommend the planting of apricot-trees in the borders. To do this properly, the soil, if not calcareous, should be made so by mixing 1 square yard of chalk to 10 of the natural soil. In forming the borders, the soil, unless rich and fertile, should first be refreshed with a slight dressing of manure on the surface rim, two or three inches deep, and then stirred to a depth of 20 inches; no other preparation is required. The trees should be planted in this rather shallow border, be heavily watered, sufficient to remain a week; at the end of that time the entire border should be gone over with a wooden rammer of about 10 lbs. weight, and rammed firmly down.

The border, thus rammed and levelled, should remain solid, and never again be stirred, except to be slightly pricked with a fork in spring, to admit water to the surface roots of the trees. Before being watered, a slight dressing of rotten manure, about 1 inch in depth, should be laid on the surface of the soil, and no other disturbance of it should take place.

The season of a very fine sort, the Peach-Apricot, may be prolonged to a great extent; it generally ripens in the orchard-house about the first week in August, but by the following simple method it may be had in perfection till early in October. At the end of June some trees full of fruit should be selected, and those for a very late crop should be placed under a north wall till the first week in September, and then removed to the orchard-house to ripen their fruit. Those that are to ripen in September should be placed in a sunny exposed situation till the end of August, and then be removed to the orchard-house. The fruit from trees that are much retarded will not always prove good, unless the weather be fine and warm; but that from trees set out of doors in a sunny place, and then ripened in the house, will be most excellent.

Half-standard apricots may be made charming ornamental trees for the summer decoration of the flower-garden. For this purpose trees with nice straight stems, about 3 feet in height, should be selected, and planted in pots or tubs. They should be grown in the orchard-house, and about the middle of July be removed to the lawn, or any part of the garden where such trees would be desirable. They can be pinched into round heads and employed for summer ornaments, just as orange-trees are in many gardens: they will be found equally ornamental and more useful, because their fruit is valuable.

The most desirable sorts of apricots for pot-culture are: the Oulins' Early Peach, the earliest large apricot; the Early Moor Park; the Large Early Montgamet; the Large Early, the St. Ambroise, which follows very closely; the Kaisha; the Blenheim; the Royal; and the Peach-Apricot (like the Moor Park, but larger and a better bearer). These are placed as nearly as possible in the order of their ripening, and give a good succession.

They will come in earlier than those on walls. It must, however, be understood that fruits in thoroughly ventilated orchard-houses are not much advanced, unless the season happens to be very sunny. It is not an *early* but a *certain* crop that must be expected. I have not named any later kind than the Peach-Apricot, because it is so easily retarded, and is always of the highest excellence; it is also the most abundant bearer of all.

APRICOTS AS PYRAMIDS.

This is a very charming mode of growing apricots in pots.

The management and pruning of pyramidal apricots are not difficult operations, and may be undertaken with confidence by the most diffident culturist.

Pyramids in pots may now be bought in the nurseries. They should be potted in October or November in 13-inch pots, and if they have been properly managed they will bear a fine crop of fruit the first season after potting. The fruit should be thinned exactly as recommended for bush-trees, and as soon as the trees put forth their young shoots in May, pinching must be commenced. What a pleasing pastime it is! Every shoot but one—the leading shoot—as soon as it has made six or seven leaves, must have its sixth leaf with the end of the shoot pinched or cut off with a penknife, leaving five leaves, exclusive of three or four small leaves generally found at the base of every apricot shoot. The leading shoot must be allowed to grow longer, and then pinched so as to leave nine leaves, Two or three shoots will break out from this leading shoot; all but one of these should be pinched down to five leaves, and when this has made ten leaves, pinch down to nine; this will require to be done two or three times during the summer, the tree gradually increasing in height. All the pinched shoots growing from the stem and side branches of the tree, after the first pinching, will put forth numerous young shoots; all these must be pinched off to five leaves, as soon as they have made six or seven. This must be constantly attended to till the trees cease growing. Many of my trees have often been pinched from four to five times, and every branch from bottom to top of the stems is always a cluster of blossom buds.

The tree must be formed into a cylinder or cone by pinching (the term 'pyramid' is incorrect, yet no other offers itself), and I need not say how beautiful such trees are when studded with their golden fruit. Few trees placed under the hands of a gardener deserve or claim such admiration as a conical apricot-tree, seven to eight feet high, full of fruit. Trees of this description may be planted in the borders of the orchard-house, but on the whole, as with peaches and nectarines, I prefer pot-culture for pyramidal apricot-trees.

If pyramidal apricot-trees cannot be bought, maiden-trees may be potted in October, their side shoots pruned in to within two inches of the stem, and the following summer they will, with constant pinching, make very nice pyramids.

Pyramids in pots may stand 20 inches asunder stem from stem. Pyramids planted out in the borders of the orchard-house may be planted 3 feet apart. After a few years—for they increase in bulk slowly—the distance may be extended to 5 feet apart; as the trees may be transplanted without a serious check, these changes are easily made.

By growing the Peach-Apricot in cheap houses, as half or full standards,[1] in borders unstirred and always hard, our markets can be supplied with apricots at a price not at present thought of; such trees should be planted from 7 to 8 feet apart.

Our market-gardeners, at present wedded to their wall culture of fruit-trees, will do well to cover a few acres of ground with cheap orchard-houses, and to plant out in them half-standard and standard apricot-trees. Covent Garden will then be supplied with such apricots as have rarely been seen there. They may be sold cheap, and yet yield a profit to the growers. The Peach and the Moor Park Apricot are the only kinds adapted for this profitable mode of culture.'

Since this opinion was printed foreigners have found out the advantages of a free market in England, and have consequently inundated London with cheap and flavourless apricots; the freedom of access to the English fruit market has introduced the high-sounding names of apricots, peaches, and nectarines; but as to flavour, pah! The fruit in the shops in the Palais Royal is also expensive, and certainly deficient in flavour.

---

[1] Pyramids do not succeed so well as the above when planted out.

Taste the peaches at 2 or 3 francs each!

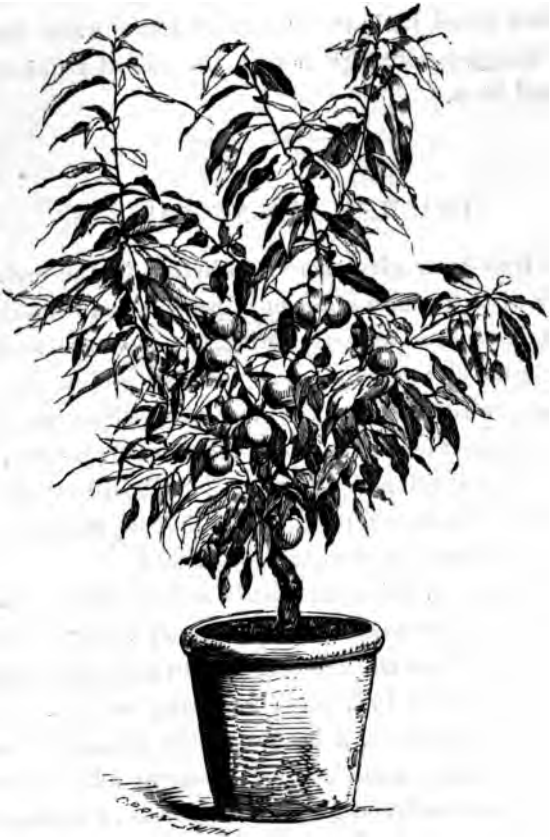
The trees, when planted out, will require in spring a light dressing of the surface-dressing compost on the surface round their stems, and of course water during the summer, although not to the extent required by potted trees.

PEACHES AND NECTARINES.

Few fruit-trees give more satisfaction in the orchard-house than a choice selection of peaches and nectarines: when in blossom, in early spring, the trees are so fresh and beautiful; they are so exceedingly prolific; and in autumn what fruit can vie in beauty with a ripe peach or nectarine? and what, to the lover of fruit-trees, can be more gratifying than to see his sideboard or dining-table decorated with peach-bushes in pots, studded with their lovely and perfectly ripened fruit?

If bushes of only a moderate size be required, 11-inch pots, as recommended for apricots, may be used. It is surprising to see the vigorous growth and fine fruit of peach-trees in 11-inch pots; for owing to the compost being rammed down, a large quantity of nutriment is compressed in a small space. I may as well, however, state, once for all, and for all descriptions of fruits, that if fewer and larger trees be required, larger pots may be employed; thus, 13, 15, or 18-inch pots may be used with equal success. A peach or nectarine-tree

Fig. 12.



An Elruge Nectarine-Tree, three years old.

(From a Daguerreotype.)

may thus, in two or three years, be made capable of bearing many dozens of fruit: but I must confess that my taste inclines to small prolific trees, because one can have greater variety in a small space; and small trees are pretty and easily looked over, so that each leaf and bud, each blossom and fruit, is known.

If peach-trees already in pots, and in a bearing state, can be purchased, so much the better, for then a year is saved; but these are more expensive than either 'maiden' or 'cut-down' trees, the cost of which is generally about 2*s.* to 2*s.* 6*d.* each. I may here state that 'cut-down' trees are two years old, and if nice healthy trees with fully ripened shoots can be found, they are better than 'maiden' trees. But as they are not often to be met with, I will first give the treatment required by one-year-old or 'maiden' trees.

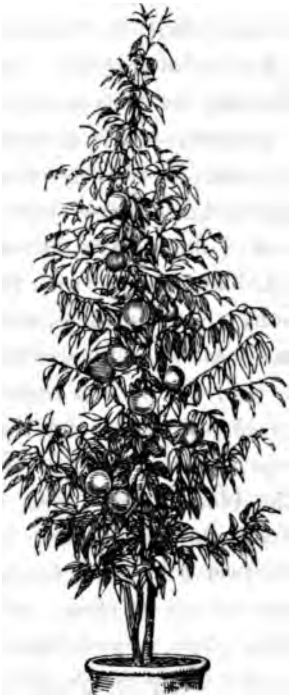
These have one shoot, more or less vigorous, which should be well furnished with buds towards its base. This shoot must be cut clean off with a sharp knife, at the seventh bud from its base, and the tree then potted in the same compost recommended for apricots, in the same sized pots, and at the same season, being towards the end of October, or early in November.[1] The following summer every bud will, or ought to, produce a shoot. If there are seven shoots, the tree is formed for the season: they need not have their tops pinched off, but will merely require the laterals (small side-shoots) pinched off to within two buds of their bases, as soon as they are four inches long. This will induce the ripening of the shoots, so that by the end of the summer they will be full of blossom-buds. At the end of August the point of each shoot should be pinched off, and they will then only require the annual pruning, either in autumn or in spring, for which directions are given. If the tree puts forth a fewer number of shoots than seven, the tops of all should be pinched off early in June; each shoot will then put forth three or more young shoots; all that are not required to form the tree must be pinched off in the same way as laterals, leaving seven, or, if the tree be vigorous, nine shoots to each tree. These trifling manipulations are easy to do, but difficult to describe: so, to make the matter as clear as possible, let us place a young tree before us early in June, with five branches, each twelve inches in length; then let us, with a sharp penknife, shorten each branch to nine inches; then, at the end of June, let us take the same tree in hand, and we shall find that each shortened branch has put forth two or three shoots; we must pinch these so as to leave on four branches two, and on one only one, making nine shoots, which as they grow should have their laterals pinched off regularly; they will then make vigorous trees in one summer, and form an abundance of blossom-buds. No other pruning is necessary the first season; and if abundant ventilation and syringing daily have been attended to, the fruit-buds will, towards the end of August, begin to be fully developed. The experienced gardener can at once distinguish them: such a person may prune his trees early in October. Let me endeavour to tell how to distinguish a fruit-bud, which, by the way, is the only bud to prune down to.

---

[1] This season is recommended, but it may be departed from; for my peaches and nectarines are sometimes not potted till March, yet they make fine growth.

Well, then, generally—or 'general always,' as a foreign friend expresses it, when he wishes to say anything that invariably takes place—towards the base of each of your seven or nine shoots, you will find four or five pointed single buds, covered with their brown coat: these are leaf-buds. Next to these, and higher up the shoots, are triple buds—a plump silver-coated one on each side, and a thin one in the centre: these plump silvery buds are blossom-buds, and the central one a leaf-bud, which produces a shoot so necessary to the well-being of the blossom-buds, that without it they would be abortive. Be sure to have on each shoot, if possible, nine to twelve of these triple buds, and cut off the shoot close to one of them; if this cannot be found at the proper place, so as to be able to form the foundation of a nice, regularly-shaped, bush-like tree, cut off the shoot at a leaf-bud. If the leaves be pruned in autumn, the buds are difficult to distinguish; it will, therefore, be better for the beginner not to prune his peach and nectarine-trees till February, or early in March, when every bud will plainly show its character; the blossom-buds by that time will have opened their silvery coat and the bright pink will be peeping out. If the shoot be cut off at a single blossom-bud, it will

FIG. 13.



A pyramid of the Rivers's Early York Peach from a photograph, Tree seven years old.

die down to the next leaf-bud; this must, therefore, be carefully avoided.

Let us now proceed with the culture of our maiden tree. A season has passed; it is early spring, say the middle of February, and our tree, with its nine branches of the last summer's growth, is before us: three of these should be cut down to within five buds of their bases, to give a supply of young shoots for the succeeding year, and six should be cut down so as to leave on each branch ten or twelve triple buds. These are the fruit-bearing branches for the present season—and so it must be every year; a few branches, say one-third, must be cut in closely on opposite sides of the tree to give young shoots, and the remainder left as above to bear fruit. Those shoots that have borne fruit will often require to be cut out, to make the tree dwarf and prevent its becoming naked, as the spurs die after bearing, unlike those of the apricot and plum, which continue to bear fruit for many years. Much will depend upon the sort cultivated, and the vigour of the tree. One thing must be borne in mind—do not let the tree become bare of young shoots towards its base, or tall and straggling. If pruned in spring, the nature of every bud may be seen, and the tree formed, by the proper use of the knife, into a fruitful beautiful bush.[1] From twelve to fifteen leading shoots should be left, in summer pruning, on each tree when in a full bearing state.

---

[1] When the trees are in a bearing state, many short spur-like shoots, from four to six inches long, will be made every season on the stem and towards the base of the principal branches.

These will be generally covered with single-blossom buds and a terminal leaf-bud: they may be removed if too much crowded, ***but never shortened.***

I have thus endeavoured to follow the 'maiden' tree to its fruiting state. The 'cut-down' tree, which should have four or five branches, should be potted in autumn and pruned in early spring: each branch must be shortened to six inches; these will put forth numerous young shoots, which in June should be thinned out with a sharp knife, leaving nine or more shoots to be pruned the following spring, as above directed. If trees in pots three or four years old in a bearing state can be purchased, it is a saving of time; for, if they be potted before April, a crop of fruit may be expected the ensuing summer. In such trees, the shoots intended to bear fruit, and covered with triple blossom-buds, may be shortened to ten buds, and those which are to make young shoots for the next year's bearing should be shortened to five buds.

SUMMER PINCHING.

Pruning of bush-trees by summer pinching only has been practised here to a large extent. As this is the most simple of all the methods of pruning known, and may be practised by any lover of gardening who does not mind employing his finger and thumb when walking in his orchard-house, it is worthy of a few lines of description.

A peach or nectarine tree of the usual bush-like form, two, three, or four years old, may be potted in the autumn. In March its shoots should be shortened to about half their length, forming the tree into a round bush. In May it will put forth young shoots. As soon as six or eight leaves have been made the shoot must be pinched off, leaving five leaves exclusive of one or two small leaves at the base of the shoot, which are without buds: every shoot must be thus operated on. In eight or ten days fresh shoots will be put forth; these may be allowed to grow until they have made ten or twelve leaves, and the shoots pruned down to five or seven leaves. I cannot impress too much upon the cultivator that the first pinching is the most important, and by this operation the shoot treated is provided with bloom buds for the succeeding season. Thus, the after-pinching is more for the purpose of regulating the tree, for the admission of sun and air, and for the production of a proper and symmetrical form. The orchard-house must not be crowded with foliage, and the cultivator will see the positive necessity of apparently severe pruning until the middle or end of July. If the pinching be continued till the end of August, a great number of shoots will be a mass of blossom-buds, without a terminal shoot or leaf-bud; and although they may be cut out, and yet leave more blossoms than the tree can carry on to a fruiting state, it is as well to have most of the spurs with a terminal shoot or leaf-bud. If bush-trees are in very large pots, or planted in the borders of a large house, and it is desired to have them increase more rapidly in size than pinching to three leaves will lead to, the pinching should be at the sixth or eighth leaf, leaving five or seven in every operation instead of three. This is applicable to all kinds of fruit-trees under summer pinching, when large trees are wished for. My trees, under this pinching, are sturdy bushes, full of blossom-buds, and quite pictures of robust health, and the fruit they bear is always large and high-coloured, owing to its full exposure to the sun. In March it is good practice to thin out some of the numerous blooming spurs and clusters of blossom-buds with a sharp penknife; otherwise the trees will be too much crowded with blossoms. This thinning out may also often be done in summer with advantage, for if the tress grow very luxuriantly, the young shoots become crowded, and the thick mass of leaves shades the fruit too much: in such cases the young shoots may be thinned out in the month of July, much to the advantage of the tree.

This simple and charming method of pruning, discovered in 1858, was fully carried out in the summer of 1859. It is strange that it was not in practice at an earlier date so many cunning hands and eyes being at work on the best method of producing fruit. As far as regards myself, I think it was the fear of inducing, by pinching, too many young shoots to break out, that deterred me from practising it. Reasoning from theory only, I imagined it to be impossible for young shoots made in August to ripen, forgetting the warm autumnal atmosphere of the orchard-house. I do not hesitate to assert that this simple step forward of pruning by ummer pinching, is one of the most successful advances hat have ever been made in fruit-tree culture under lass.

I may add, that if by any neglect the pinching of he shoots in June and July has not been attended to, o that the trees have made shoots of from 2 to 3 feet n length, these may be shortened with a sharp knife to 0 or 12 leaves. The bud at the end will then form tself into a leaf-bud, and even make some small rowth, while all the buds below will remain fruituds, and quite dormant till spring. I tried this xperiment in August 1861.

No anxiety need now be felt even by the orhard-house cultivator. Thinning in early spring the lusters of blossoms with a penknife (for they are lways too numerous, and at least half of them may e cut out), and at the same time shortening shoots hat are irregular; and in summer pinching off the nds of the young shoots, always fragrant, so as to ive symmetry to the tree and make it pleasant to look n, are all agreeable operations. The climate of the rchard-house will do all the rest, and a peach-tree in a ot *will* bear fruit even under very adverse pruning ircumstances. All that seems to be required is to ake the tree symmetrical, and prevent its bearing too ountifully; for it must be borne in mind that fruit om a tree overloaded, whether under glass or in the pen air, is never of fine flavour. Peaches, pears, lums, apples, and indeed all descriptions of fruit, suffer in flavour to an extent scarcely thought of, if the tree be allowed to bear too many. It is better to have one dozen of peaches large, and of fine flavour, than two dozen small and inferior; besides this, a tree suffered to bear too large a crop will be sure to fail the following season.

I may here give another direction; if your peach or nectarine-tree appears to be crowded with shoots, cut them out; your tree will, in any case, produce flowers, and consequently fruit enough to destroy its vitality, therefore you need not fear to suppress the overgrowth. With trellis and U training a selection must be made, which is not necessary with bush or pyramidal culture—the most simple and natural.

GENERAL CULTURE.

There are two methods of cultivating these fruits in orchard-houses, both equally favourable to their well-doing: one is to cultivate the trees in pots, the other to plant them in the borders of the houses. With the large houses the most eligible form of tree to plant in pots is the pyramidal; this most interesting form succeeds better in pots than when planted in the borders; the roots being confined, the shoots are not so gross as those on trees planted in the ground, the sap does not rush to the top so rapidly, leaving the lower branches in a weakly state; in fact, it seems more regularly distributed, so that for many years a pyramidal peach or nectarine-tree, in a pot from 15 to 18 inches in diameter, will gradually increase in beauty, and by the simple operation of pinching all the young shoots formed during the summer, to two, three, or four leaves, a fruitful and beautiful pyramid, 10 feet or more in height, may be formed. Such trees, placed among others planted in the borders, are most ornamental, showing, as they will do if attended to, perfect cultivation. The health and fertility of such trees is kept up by giving them every season some fresh food in the shape of a rich compost formed of loam (if tenacious, all the better) and manure, thoroughly decomposed, in equal quantities. This operation should be performed about the last week in October, by removing the surface soil—generally a network of fibrous roots—to a depth of 4 or 6 inches, and replacing it with fresh compost of the description just given. The most important matter connected with the culture of trees in pots is keeping their roots dry during the winter months, so that they are not too much excited (they are never at rest); the shoots then become dry and ripe, and in a fit state to put forth their blossoms in spring, which, owing to the trees not being subjected to the great atmospheric changes incident to the open air in an English winter, they do with great vigour. To make success doubly sure, this dryness of the soil in the pots must be strictly attended to. The trees should be well watered when top-dressed, and again before the middle of November; they may then, if in the large pots I have mentioned, remain without water till early in March, when the blossom buds begin to swell. Many failures in the pot culture of fruit-trees have occurred from the fears entertained by cultivators that trees must always have their roots in a soil saturated with moisture—the great evil of our English climate, for if the roots of our fruit-trees in the open air could be kept from the heavy rains of our winter months, we should have much greater success in the culture of the more delicate kind of fruits.

Before I leave the subject of pot-culture I must mention the necessity of giving the trees extra food during the summer months. This is best done by placing on the surface of the mould in the pot a layer of some rich compost, about 3 inches in depth at the outside, and made concave round the stem of the tree, or round the rim of the pots, sloping to the stem of the tree, so as to retain water. This compost may consist of manure chopped into small pieces, and saturated with liquid manure; or horse-droppings from the roads, and kiln-dust[1] from a malt-house, equal quantities, also saturated with liquid manure: the latter compost is the most valuable surface-dressing ever invented, for not only do the roots of peach-trees come to the surface to feed upon it, but vines, if dressed with it, show extraordinary vigour. If a vine in a pot has a dressing of it from 6 to 8 inches deep (this must, of course, be supported by pieces of slate stuck inside the rim), the roots ascend rapidly, and seem to devour it with avidity, so that by the autumn a mass of this compost on the surface of the soil in the pot, in which a vine has been growing all the summer, will be found a complete mass of fibrous roots, hard and compact, the virtue of the compost being seemingly absorbed.

---

[1] Be sure to have kiln-dust, not malt-combings.

I have thus far endeavoured to give an outline of the pot-culture of peaches and nectarines in unheated glass structures. The other method of cultivation, by planting the trees in the borders, must next be considered; this is neither more nor less than planting a peach garden, such as one would do in Italy or in some of the States of North America. Still as a glass structure is of more value than a piece of uncovered ground, care must be taken that it is made the best of. There is a peculiar feature in most stone fruits—their love of a firm soil. A light porous soil is generally fatal to the health of a peach-tree, at least in the gardens of Europe. How the light soils of Buenos Ayres and other parts of South America act on the constitution of the peach-tree, I am not able to say; I only know from report that the trees make good firewood.

In orchard-houses, I am now able to assert, with full confidence, that a firm border for peach and nectarine-trees is a *sine quá non*; there is no sound prospect of success without it; and I may add, that if such a border is calcareous, or can be made so by mixing one square yard of chalk to ten of the natural soil, so much the better for the fruit-trees. In forming the borders, the soil should be refreshed with a slight dressing of manure, and then stirred to a depth of 20 inches—no other preparation is required. The trees should be planted in this rather shallow border, heavily watered, and suffered to remain for a week; at the end of that time the entire border should be gone over with a rammer, and rammed firmly down; a wooden rammer of about 10 lbs. weight will be found the best implement.

The border thus rammed and levelled should remain solid, and never again be stirred, except to be slightly pricked with a fork in spring—early in March—to admit water to the surface roots of the trees. After being watered, a slight dressing of rotten manure, about 1 inch in depth, should be laid on the surface of the solid soil, and no other disturbance of it should take place. So obnoxious is the disturbance of the soil to the roots of peach and nectarine-trees, when planted out—although the inert surface mass of fibrous roots may be removed from trees in pots without injury—that I have seen in an otherwise well-managed house fine and well-grown half-standard trees[1] quite bare of fruit, owing to the borders having been carefully dug 6 inches in depth in spring, every blossom having consequently dropped, without setting its fruit.

---

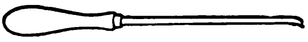
[1] Standard and half-standard trees, growing in the borders of an orchard-house, should have their heads pruned on the tabular system, *i.e.* have their central shoots cut out so as to form flattened heads. The sun then shines on the fruit and gives richness and flavour.

I have thus far endeavoured to give the principal outlines of the successful culture of those favourite fruits, peaches and nectarines. All that I have said has been gained by observation and experience, and I see no reason why the principles here laid down should not be applicable to all soils and climates in which their cultivation requires the assistance of glass. I will even go further, and fearlessly assert that their culture, when trained to walls, may be much benefited by solid undisturbed borders.

Peaches and nectarines, either in the open air or under glass, are in our climate inclined to grow too vigorously: pot-culture here gives a great advantage. The trees should be lifted, so as to break off all the roots that are entering the border from the apertures at the bottom of the pot; this operation should be performed once a week, commencing the second week in June (see Calendar, p. 216), and continued till the end of July; they may then be suffered to make roots into the border till the fruit is gathered. By this treatment the trees become sturdy and short-jointed, *i.e.* very short spaces will be found between the buds. Trees that have been from five to seven years in pots will require abundance of water daily, in summer, as the pots become full of roots, and absorb a large quantity. When trees of several years' growth are shifted into larger pots, large coiled roots will be found at the bottom; these should not be cut or pruned in any way.

The best implement for the autumnal top-dressing is a piece of iron rod an inch and a half in circumference and nine inches long, flattened at the end, with a handle of wood five inches long, like the annexed figure (fig. 14).

FIG. 14.



CULTURE OF TREES IN POTS BY SURFACE-DRESSING ONLY.

It is now some few years since that I discovered some apricot trees in pots that had been forgotten; they had had no top-dressing in October, yet they were so full of fruit that they exceeded in number the leaves. Now, although I had had for some fifteen years fine crops from my old trees, yet some of them failed occasionally, which I found was from their having been top-dressed needlessly, so as to take out too many of the small roots of the trees as well as the usual inert mass of fibres near the surface. I had these trees at once taken under my protection, and rich surface-dressings given to them—not digging out the roots previously, but only scraping off the surface. The pots were not large, and so full of roots that I feared the fruit would be small; this was not, however, the case. The surface-dressings gave them food enough, and they produced abundant crops. Ever since then a large proportion of the apricot trees in pots here have had summer surface-dressings only, and have done well. Peach and nectarine trees in pots may be treated after the same mode. The question to be decided is—can peach-trees in pots, which are more gross feeders than apricots, be kept in their full vigour by summer surface-dressings only? The experiment is worth trying, varying a little from the treatment recommended for apricots, in p. 60, in this particular. Peach and nectarine trees in pots in my orchard-house seem to devour the rich surface-dressing given to them in spring and summer with avidity, and come to the surface so as to form circular mounds round the circumference of the pot. The removal of such masses of roots in spring, when the fruit is set, as with apricots, may give a shock to a peach-tree more than that hitherto received by apricots, which do not throw up roots so abundantly as peach and nectarine trees.[1] Their management should therefore differ to this extent; the surface soil and masses of fibrous roots should be scraped as recommended for apricots, p. 61, in October instead of in May, and a slight surface-dressing at once applied, to remain all the winter and be renewed in the spring. There is no doubt but that this method of feeding trees in pots will keep them in health for a certain period, say two, three, or more years, when the soil must be renewed by an abundant top-dressing. Surface-dressing alone is a saving of labour in autumn, but a renewal of the soil in the pot is a necessity, if not annually, at least once in two or three years.

---

[1] This may seem strange, considering that peaches and apricots are grafted on the same stock—*i.e.* the plum; but it is nevertheless true. The explanation may be, that apricots, with their large leaves and vigour of growth, may absorb more of the vital force of the tree, thus preventing the emission of as many rootlets as the peach allows.

PRUNING OLD TREES.

My house about the end of February or beginning of March, according to the season, is prepared for the summer growth of the trees; it is 24 feet wide, and, being span-roofed, is divided into a central border and two side borders. The trees since November have been covered with straw (as to the pots), and have received little if any water. After cleaning the glass and rafters, and scrubbing all the wood work to destroy insect life as much as possible, a layer of burnt earth and cinders is placed on the ground, about 1 or 2 inches thick. The trees are placed at regular distances, 3 feet from stem to stem as far as possible, watered thoroughly, and the stem and branches washed with soft soap, taking care that the mixture is not strong on the flower-bearing shoots (on the trunks it should be powerful); wash well with clean water after the dressing. My pyramidal trees are 9 feet high, and being fifteen years old are, though full of fruit buds, not quite so symmetrical as they were in the bloom of youth. To preserve the form of the pyramid is the first care; the fruit and wood buds are now with the returning spring well developed, and an inspection will satisfy the amateur that he need have no fear of the trees being barren; and he may prune almost mercilessly. Take away all naked shoots, and calculating how much fruit the trees can bear, &c., prune the bearing wood hardily, always keeping the pyramidal form. The wood at the top will, if not steadily kept down by summer pinching, be more vigorous than the lower branches, and must be reduced accordingly. Prune strictly down to the wood buds, although a great apparent sacrifice is made of the flowers, for on these wood buds depends all the future wellbeing of the tree. The peach produces flowers so vastly in excess of the fruit which it can possibly sustain that it is overtaxed; and, being under glass, most of these flowers will set their fruit, giving much extra work in thinning. For the round-headed bush and half-standard trees the same severity must be practised. I defer the pruning until the end of February or the beginning of March, as the buds are then easily distinguished, the wood buds being small and pointed, and the flower buds round and plump.

There is a great charm in a well-managed orchard-house in the early sunny days of March; the thermometer, with a very mild sunshine, being generally 10° above the outside temperature; the trees, released from their long winter's rest, preparing to burst into flower; the fresh watered soil giving out a refreshing and pleasant smell; and, the greatest comfort of all, the cultivator breathes a mild and agreeable atmosphere, even while a sharp easterly or northerly wind is blowing outside. If the house has been carefully decorated with pots of crocus or scillas, it may be gay with flowers.

VENTILATION.

There is a matter of importance in the culture of peaches and nectarines to which I beg the reader's special attention, although it is a repetition—and that is free ventilation. In the warmer parts of England, and more particularly in Surrey, I have heard of failures in growing peaches and nectarines in orchard-houses, owing entirely to the attacks of the red spider, brought on by unskilful management of some cultivators who persist in shutting up their houses at four o'clock in the afternoon in hot weather, and not opening them till nine in the morning; the trees were thus suffocated, and so enfeebled as not to be able to resist the attacks of this most persevering and insidious enemy. An orchard-house may be closed early in the afternoon, say four o'clock, when the fruit is swelling for ripening, to hasten the process, but it must be opened in the morning before eight. Now let me advise anyone who has such a servant to open all the shutters about the first week in July, and have them nailed so that they cannot be closed; they may remain so till September 1. If the trees are regularly syringed, no red spider will make its appearance, and the fruit will be of much finer flavour for this constant and free ventilation. The usual and proper mode of ventilation is to have the shutters open by day all through the spring and early summer months (in the south of England the dry cold winds may blow through the house in bright days, while the trees are blooming, with much benefit to the blossoms), and open night and day as soon as the peaches begin to colour, unless the house be in a very exposed place, and the weather cold and windy; then they should be only partially open. These ventilating shutters should always be on a low level—the lower edge of the aperture about two feet from the ground—and at the same level back and front in lean-to houses, as must be the case with those on each side in span-roofed houses.

In situations much exposed to wind, netting with small meshes, or, if not convenient, common netting, double or treble, should be fixed inside the ventilators so as not to interfere with their being closed. This may remain from the time the trees are in bloom till the fruit is gathered. It will prevent strong currents of air from injuring the young leaves. But few gardeners have the courage to give air enough to orchard-houses and vineries; in my lean-to vineries, without fire-heat, abundance of air is given night and day, from the middle of July till the grapes are ripe.

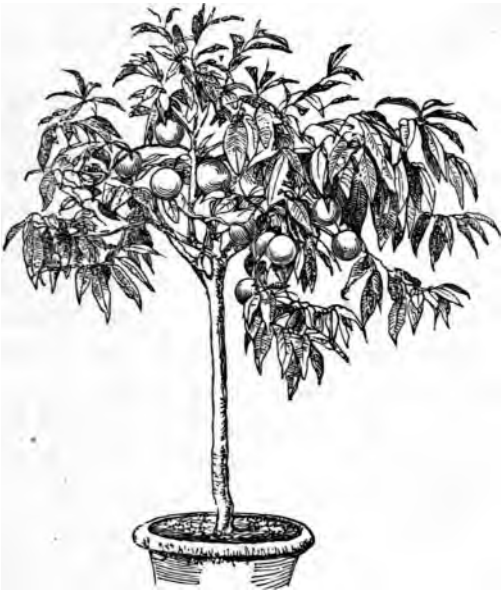
Trees that do not bear fruit may be removed from the orchard-house into the open air about the second week in July, remaining outside until October. All trees may be removed from the house until this month, after the fruit has been gathered. Plenty of space will thus be given to the remaining trees.

RETARDING.

A very simple and agreeable method of retarding such mid-season peaches as the Noblesse, Royal George, and Grosse Mignonne, and all mid-season nectarines, may be practised as follows:—Remove the trees from the orchard-house to the open air at the end of July; place them in some warm sheltered place, or in front of a south or south-west wall, about two feet from it. In a few days both peaches and nectarines will change to a deep crimson, and, if the weather be sunny, their flavour when they ripen will be very vinous and piquant. Under this treatment, such sorts as I have named above will ripen by the end of September, or later, according to the state of the weather. By this method, the season of our fine melting peaches and nectarines may be much prolonged, and in cases where the absence of a family may require it, the whole crop of an orchard-house can be retarded. Half-standard peaches and nectarines with nice round heads may be used as ornamental trees, in the same way as recommended for apricots; in the south of England they will ripen their fruit in the open air very late in autumn.

In 1877 the orchard-house produced large crops of fine fruit in a season of unexampled scarcity. I see by my note-book that the first fruits to ripen were the Early Rivers and Early Purple guigne cherries. From May 25 to the end of July cherries of fine size and quality were every day *en évidence.* On July 6 the Early Beatrice peach ripened, closely followed by the Early Louise, July 12; the Early Rivers, July 14; Hale's Early, July 20; Early Leopold, July 24; Seedling Early York, July 31; all these peaches being grown in an unheated house.

FIG. 15.



A half-standard tree of the Alexandra Peach.
(From a Photograph.)

These early peaches are the produce of many experiments in breeding, and until they were raised, a continuous crop of peaches in July was only to be obtained by skilful and expensive cultivation.

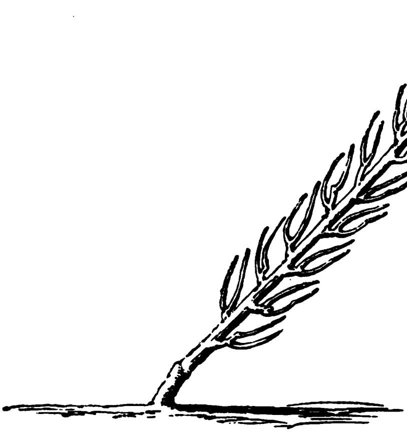
DIAGONAL PEACH AND NECTARINE TREES.

WITHIN these few years a method of growing peach trees against walls has been brought into notice in France. This is called training 'en cordon oblique' (fig. 16), in English, diagonal training, and is carried out by planting against walls maiden trees 15 to 18 inches apart at an 'angle of forty-five degrees.' The lateral shoots are shortened in closely, and rigid summer pinching is practised, so that a wall is soon completely covered with short fruit-bearing shoots. In warm climates and in dry soils this method has been found to answer very well, but has been objected to in climates and soils of a contrary description, as the vigour of the trees is not restrained enough by the most severe summer pinching. The French gardeners do not know, or will not practise, root-pruning, which would doubtless make these very pretty trees abundantly fruitful. Fig. 16 is one of these oblique trees—a portrait taken here of a tree trained to the back wall of a lean-to orchard-house.

This mode of training peach and nectarine trees, although not adapted for walls in the open air in

England, may be practised with great success in lean-to orchard-houses, so that their walls at back may soon be covered with bearing trees. The 'modus operandi' is to select maiden trees well furnished with eyes from bottom to top; if the trees are very vigorous, as they often are in cool moist seasons, and have attained a height of 6 feet, they should be reduced to 3½ feet, and then all the lateral shoots should be shortened to one bud, and this as close to the stem as it can be found. Such trees may be planted, say 18 inches apart, at the above angle—if the space is confined 15 inches will do—and a leading shoot encouraged; this will, in the course

Fig. 16.



A diagonal trained Peach-tree.

of two or three years, reach the top of the wall, and your tree will be in round numbers 15 feet in length, and a cordon or rope of clusters of blossom buds. The aspect of such a tree is badly conveyed by a figure, as the clusters of stumps, which the incessant summer pinching leaves, cannot be conveyed to paper. It must be understood that this applies solely to the single diagonal cordon, being the most simple, leaving the compound cordons to M. Bréhaut, who in his book has so well described them; and below is the method of pruning followed here with cordons of peaches and nectarines trained to the back wall of a lean-to house 430 feet long, and 14 feet wide, and 9 feet high—an excellent position for them. The pruning of these trees has been so simple, and hence so widely different from the modes pointed out by French cultivators, that one almost hesitates to ask, 'Can this be correct?'

As soon, in May, or June, as the young shoots have made their appearance, and are of sufficient length, they are all pinched down to three leaves, and all the summer, up even to October, the young shoots, which are incessantly making their appearance, are pinched to three leaves. Clusters containing innumerable blossom buds are formed all up the stem, as far as the young leading shoot of the present season; this, if it is too vigorous, may not form blossom buds; if so, its vigour may be checked by cutting its terminal leaves in half, twice or thrice during the summer. As soon as the leading shoot has reached the top of the wall it should be cut off, and kept to the height of the wall by pinching, and as soon as it has attained to its second year of growth it will be covered with blossom buds, and your tree 15 feet in length will be in truth a cordon.

Following out this very simple practice, and without attempting to dive into the *rationale* of it, thin out the clusters of decapitated shoots in the month of February, so as to remedy the excessive crowding of the stumps, and as soon as they come round pinch and pinch again.

It is well known that the usual fan-trained peaches require to be planted 20 feet apart, either against walls in the open air or under glass. Now, if the back wall of an orchard-house 20 feet in length would hold one tree of the old mode of training, it will hold twelve single diagonal trees, presuming the wall to be 10 feet in height. There will be thus twelve trees giving 180 feet of branches full of fruiting buds, and capable of bearing, when fully established, some fifty or sixty dozen of fruit; not of one sort, as must be the case with one tree (unless budded with various sorts), but of several kinds, varying in their season of ripening.

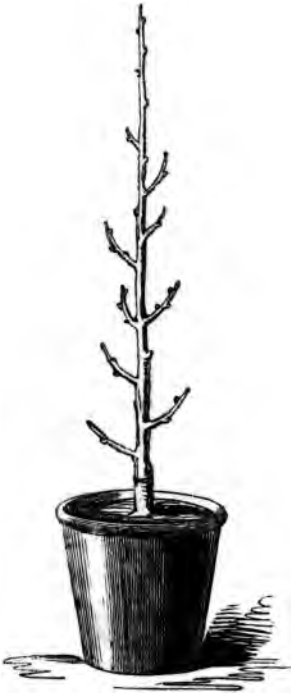
Cordons with rough pruning and elongated shoots will produce fruit in profusion.

PYRAMIDAL PEACH AND NECTARINE TREES.

This method is a modification of the diagonal mode of culture for the orchard-house, by forming peach and nectarine trees into compact pyramids, and a figure is annexed of a maiden tree potted and pruned (fig. 17). For this purpose, maiden trees with straight stems, and well furnished with lateral shoots, should be selected and planted in 11-inch pots. They should not be more than from 4 to 5 feet high; if more, their tops may be cut off to that height. Each lateral shoot should be cut down to two buds; these and the buds on the stem will in May give numerous shoots. As soon as they have made seven or nine leaves pinch off the end of the shoot, leaving five leaves, not reckoning three or four small leaves generally found at the base of each shoot, which are without buds in their axils, and will not put forth a shoot. These pinched shoots will soon put forth a fresh crop; every shoot of this second crop should be suffered to grow till it has made seven or eight leaves, and then be pinched to four or five leaves, and all succeeding crops of shoots must be pinched off to three leaves as soon as four or five leaves are formed, unless larger and more spreading pyramids are desired. In such cases five or even seven leaves may be pinched down to with advantage.

In the summer pinching of these pyramids it is good practice to pinch all the shoots at the top of the tree a week or so before the lower shoots are operated upon, and to allow the lower shoots of all to grow at the end of the season, *i.e.*, not to pinch them later than July. By the top shoots of the tree I mean those from the top to two feet down the stem.

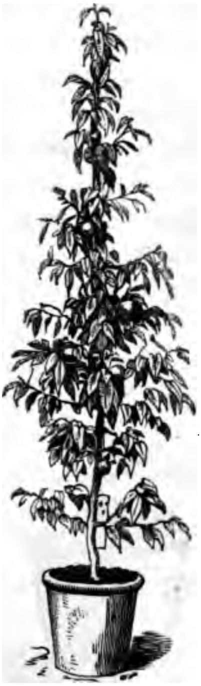
FIG. 17.



A Peach-tree pruned to form a close Pyramid.

If it be desirable to increase the height of the tree, the leading shoot at each pinching may be left with seven or eight leaves.

Fig. 18.



A Pyramidal Peach-tree, three years old.
(From a Photograph, July, 1870.)

This summer pinching of the shoots of a potted pyramidal tree, in the climate of the orchard-house, will, in one season, form a compact tree, with plenty of short fruit-spurs. In spring these, if too crowded, must be thinned out with a sharp penknife, so as to leave them as nearly as possible at regular distances, and shortened down to a leaf-bud or triple bud (either will do); and in summer the fruit should be thinned, and the shoots pinched in, as directed above, every season. Occasionally it will be necessary to remove shoots from the centre, if the growth is dense, the object being to admit sun on the fruit.

A fruitful pyramid will thus be formed, on which the fruit will be fully exposed to the sun and air. A great number of trees may in this way be grown in a small space, and they will form beautiful objects of high culture.

It will be seen from what I have already said, that the pinching in of pyramidal peach and nectarine trees does not differ much from that recommended for bush trees. When the trees are vigorous, instead of ceasing to pinch at the end of July, as with bush trees, pyramids may be operated upon till the middle or end of August. It is true that in the spring, when the blossom buds are swelling, many spurs will be found without leaf-buds, but these may all be cut out, and sufficient will be left. Unless late pinching is practised with these trees, they are apt to become too loose in their growth, and their side branches long and bare of shoots and buds.

Occasionally, with luxuriant growth, shoots will break from the axils, with a long and tender stalk; when these are noticed, cut them down close to the axil of the leaf from which they spring, and at the same time leave the leading shoot alone; this will carry off the superabundant sap. See fig. 19; but cut the shoot instead of the leaf.

Pyramidal peach- and nectarine-trees may be planted in the borders of orchard-houses, but in small span-roofed or lean-to houses they are apt to disappoint the cultivator, for they *will* make such vigorous growth towards their tops, leaving their lower branches weakly and unfruitful, so that, on the whole, the pot-culture of pyramids is to be preferred.

Annual removal has been tried, but in stiff calcareous soil, after two or three years, the trees do not thrive so well as those growing in the same house unremoved. In some soils it is quite probable trees would flourish under this annual removal, or at least annual root-pruning; but unremoved trees, although too large and too vigorous for the borders of a small span-roofed house, yet bear fine crops, and although one sometimes thinks their strong shoots will break through the roof, they are beautiful objects, their shape being between pyramids and half-standards.

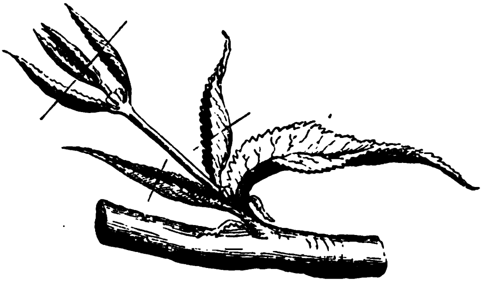
By accident a method of checking excessive luxuriance presented itself, which seems against sound theory, yet it has done well for several seasons, and seems likely to continue to succeed. The following is the manner to do this rather eccentric method of pruning:—

In 1862, buds of some kinds of peaches and nectarines were much wanted for propagation. Therefore some of the trees were allowed to make their first growth without being pinched; the shoots they made were most vigorous, many of them from 4 to 5 feet in length. About the middle of July these strong shoots were all cut off to within six inches of their base, leaving the small shoots untouched. The trees were loaded with fruit, and this sudden decapitation might have put the crop in peril, and caused it either to cease to grow, or drop off in its then immature state. The fruit, however, grew to its full size, and ripened well; the decapitated shoots put forth numerous young shoots, which on August 30 were pinched to within three and four leaves of their base; and the trees were healthy, promising, and capable of bearing good crops of fruit. Their growth seems much more under control than those planted in the same border that have been under pinching all the summer. Closely pruned pyramidal trees, or trees 'en fuseau,' may after some years' growth be allowed to grow into pyramids in extension, the original close pruning being an excellent preparation. When the trees are old, and long flowering shoots are produced, calculate the number of fruits that a shoot can ripen, and prune back to a leaf branch. Do this when the fruit is set, and provided that fruit remains on the branch after pruning.

LEAF-PINCHING OF PEACH-TREES.

A fruit cultivator at Chartres, M. Grin, published a pamphlet under the title of 'Pincement des feuilles,' which, he says, is most successful in the culture of the peach; it must be so, if we have full faith in his directions, for he says: 'I operate solely on the leaves, organs most essential to the wellbeing of the tree; the results are, that I have no wounds, no deformities, no maladies, for in it we approach to nature, who never uses the knife.'

FIG. 19.



The extract from his pamphlet, freely translated, is as follows:—

'I have pursued the system of stem-pinching since 1851. In several modifications of this method of pruning I have discovered that the simple pinching of leaves is sufficient to control the tree.

'If during the month of May the stipular leaves are cut in half (see fig. 19) the spurs starting from any but the two lowest buds will develop themselves into shoots; but if the stipular leaves are divided the simple operation will cause the formation of fruit-buds. There is also an advantage in this leaf-pruning—the tree not being, as in spur-pruning, deprived of its shoots so necessary to health and longevity. Leaf-pinching, as I practise it, has nothing in common with any other method at present practised. During the month of May,[1] as soon as the young shoots have grown a few inches, I pinch the bunch of leaves at the extremity of each shoot.[2] This operation gives at the end of the year fruit-bearing buds. This is certain, for I have proved it in a thousand instances. I do not pinch the principal leaf, but I pinch the stipular leaves at the base of each shoot. The result of this pinching will be to produce buds, which I leave to form future fruit spurs.

'The advantage gained is obtaining shoots closer to the stem than any other method of pruning. The figure gives the manner of pinching the two stipular leaves and the bunch of leaves at the extremity of the shoots. The lowest buds will be wood-buds and the upper ones fruit-buds. If the wood-shoot developed from the base of the shoot grows too vigorously, I prevent its excessive growth by dividing the bunch of terminal leaves. This operation can be forestalled in the month of November, when pruning the wood, because at that time it is easy to see which of the wood-buds possesses the greatest vigour; the stronger should then be cut about one-third of its length. If at the top of a spur, where the fruit-buds cluster, some small branchlets appear, I remove them all save one, to favour the development of the sap. If of two fruit-spurs one becomes the stronger, I cut the bunch of leaves at its extremity the half of their length; this suffices to establish a proper equilibrium.'

---

[1] M. Grin says April, which at Chartres is equivalent to May in England.

[2] Fig. 19 is a good illustration of a false shoot for pinching. When these long and tender shoots start in growth, I generally cut them in close to the stipules, as illustrated, care being taken not to injure the stipules.

I must add, the above method is applied to wall peach-trees by M. Grin with great success. I see no reason why it should not be applied to orchard-house trees, for if pinching the leaves will repress undue vigour and insure fruitfulness, it will be a great gain. As usual with all pruning directions, those of M. Grin are difficult to thoroughly comprehend, but although from the experiments made here it appears that leaf-pinching does, to a certain extent, seem to repress vigour of growth, it does not alone sufficiently repress growth.

A peach-grower at Montreuil, some two years since, in 1877, gave me a wrinkle for producing precocity in certain fruits on the same tree; this was nothing more than splitting the fruit-bearing branch longitudinally. The fruit above the split ripened some ten days in advance; and another advantage accrued, that is, that the buds below the split developed into fruit-spurs. The part of the branch above the split having borne its fruit was removed, leaving the fruit-spurs below the split for the next year's crop; on a wall the split branch might be supported by the training and the wall, in a pot the branch operated upon must be supported by a slight stick.

MINIATURE PEACH, NECTARINE, AND APRICOT TREES.

These beautiful little trees are calculated to make a pretty variation in our desserts; they may be cultivated by summer pinching, in such small pots, that no inconvenience will be found in placing on the table a peach and a nectarine tree, about nine inches high, with from three to five fruit on each. If the pots are concealed and ornamented the addition to the table will be pleasant to the eye.

To form these miniature trees, they should be grafted on small plum-stocks (in 4-inch pots) of the kind known in nurseries as the Black Damask (Damas Noir of the French) in the month of January, and placed in a common garden-frame, heated gently by a hot-bed, or hot-water pipes. As soon as the young shoots have made four leaves, their ends should be pinched off, leaving three leaves, and all succeeding shoots pinched to one leaf. This summer pinching is never to be discontinued while the trees live, if it be intended to cultivate them as miniature trees. They should be shifted from the 4-inch pots they were in when grafted, to 6-inch pots in May, and to 8-inch pots about the middle of June. In these they must remain, without repotting, using the ordinary compost (always ramming it down firmly) of loam and manure for potting, and the compost for top-dressing recommended in p. 62. The latter operation must be performed at the same season and in the same manner, by taking out the exhausted mould halfway down the pots, as directed for the large trees.

SELECTION OF VARIETIES.

The peach and nectarine season may be much prolonged by a judicious selection of varieties.

The earliest Peach is the Early Beatrice; next the Alexander, the Early Louise, the Early Rivers, the Hales Early, and Rivers's Early York; then the Early Alfred; the Early Albert; the Dagmar; the Condor; the Early Grosse Mignonne; the Merlin; Dr. Hogg; Crimson Galande; the Grosse Mignonne; the Alexandra Noblesse; the Royal George; the Galande; the Magdala; the Barrington; the Princess of Wales; the Walburton Admirable; the Goshawk; and the Late Admirable; of which the Teton de Vénus and Bourdin are excellent varieties; the Gladstone; the Osprey; Lord Palmerston; a very fine but partly clingstone fruit, sometimes hardly a dessert fruit; and lastly, Salway, and the Comet: these ripen nearly in succession, are all melting peaches, and give their fruit from July till the middle of October, and into November. With the large 'Pavies' or Clingstone peaches of France, such as Pavie de Pompone, and Catharine, the peach season may be prolonged till the middle or end of November. A more detailed list is given in the list of selection of varieties.

A selection of Nectarines may include the following:—Advance; Lord Napier; Stanwick Elruge; Hardwicke Seedling; Rivers's Orange, very beautiful and very good; Violette Hâtive; Rivers's White; Byron; Albert Victor; Pineapple; Newton; Milton; Spenser; and Victoria, a very fine, perhaps the finest of all known fruits, and a rather late Nectarine.

CLINGSTONE PEACHES OR PAVIES.

A Clingstone Peach is generally looked at by English gardeners as a fruit of but little value, as something more akin to a turnip than a peach. They are not far from the mark, for a half-ripe pavie—a ripe one is rarely tasted in England—is a most unfruitlike production. In the warm districts of the United States the 'cling peach' is a very different fruit, and is reckoned by those who know peaches very well to be much superior in flavour to the melting sorts.

It seems to me that these late peaches deserve special cultivation by imitating, as far as we are able, the climate in which they arrive to perfection—say that of Augusta, Georgia, U.S. For this purpose a house should be devoted to them, and the trees be suffered to bloom and set their fruit without fire-heat; but towards the end of July gentle heat at night should be applied, the fire lighted at seven, and 'made up' at nine, so as to burn gently through the night; all through August, September, and part of October, the ventilators should be open all day, and half of them all night, except the weather be very stormy, till the end of September, when less air should be given. We shall by this mode of culture imitate the warm autumnal nights of the Southern United States, and keep the fruit in a growing state till the ripening period arrives. In a common orchard-house without fire-heat, the cool nights in September seem to put the trees at rest, and the very late peaches, as I have experienced, do not ripen well. In the open air, on standards, the Early York peach ripens at Augusta the latter part of June, or a full month before it ripens here in a warm season on walls. The American peaches—Heath Cling, Baldwin's Late, and Mitchell's Mammoth—all ripen there the latter part of October: we may therefore expect them to ripen here, even in an orchard-house gently heated, towards the middle or end of November, or even later; we may, perhaps, ultimately have ripe peaches at Christmas, for these late firm-fleshed sorts keep a long time after becoming ripe. In the South of France late Clingstone Peaches or Pavies are cut in slices, and served at the dessert with wine and sugar.

Owing to the firmness of their flesh, they make excellent tarts or compotes, and owing to this defect they are not eatable, and they ripen at a time when the prince of fruits—the pear—is at its prime. For the dessert, either cooked or uncooked, the pear is superior to any Pavie, no matter of what quality.

SYRIAN NECTARINES.

There is a race of Nectarines from Syria well worthy of especial culture; the best being the Stanwick and seedlings raised from it. Many gardeners have failed in its culture, finding it crack, and drop off in stoning. It is easily cultivated in pots, but requires an orchard-house gently heated; the best of houses for the culture of this fine fruit is the small span-roofed with boards, and heated by one 4-inch hot water pipe round the house. As soon as the trees are in blossom in April, the fire may be lighted every morning at six, and kept up till five in the afternoon all through May, giving abundance of air in the day, and a portion by night, although the crevices of the boards will admit some. In June and July the fire may be lighted at six in the morning and suffered to go out at midday; the trees must be syringed regularly. By this treatment the fruit will ripen in the South of England in August, be clear, free from cracks, and one of the most delicious of nectarines; its flavour is most peculiarly gratifying, and I have no hesitation in saying that no fruit of its class, except the Victoria Nectarine, can be imagined more exquisite in flavour.

GROWING TREES IN PERFORATED POTS.

In houses where it is not desirable or convenient to use very large pots or tubs, very large and fine crops may be had from trees in 11-inch pots by having holes perforated in the sides to allow the free emission of roots during the summer; for this purpose six holes are requisite, three at five inches, and three about an inch from the rim at the base, the hole for drainage being retained. The pots are then plunged in a border prepared with good soil, and well drained; the roots will grow vigorously in the borders during the summer, and will support and ripen a large and fine crop of fruit, without the constant watering necessary for trees grown in pots without plunging. In October, at the fall of the leaf, raise the pots from the border, cut all the roots outside the pot close to the point of egress, and replace the pots in the border. This should be done in the autumn as soon as consistent with the safety of the tree, as the roots remaining will commence to grow in the soil which is in the pot, this soil being renewed at the time of the root-pruning. After being grown for some time with this modified form of root-pruning, the trees will not develop the too exuberant vigour habitual to the trees which root in the ground without pruning, but they will require more space than pot-trees standing on the surface; the summer pinching should be practised as for pot-trees.

There is not the necessity for constant watering to the roots with this system, and a certain amount of anxiety is thereby removed; but there is additional expense in preparing borders for plunging, which must be well drained, and care must be taken that the soil of the borders in which the roots have been nourished is renewed either in the autumn or spring, as the growth of the year, if the trees have produced a good crop of fruit, will exhaust the nutriment; and, being under glass, the loss will not be repaired without artificial aid.

GATHERING THE FRUIT.

Some attention is required in choosing the proper time to gather peaches; for in the calm still air of the orchard-house, many kinds will hang on the trees till they are dead ripe and nearly worthless. As soon as a peach is quite soft close to the stalk, it is fit to gather; and although it may hang a day or two after it is found to be fit, a longer period will spoil its flavour. Nectarines may be allowed to hang for some days after they are ripe, and if they are inclined to shrivel on the trees they will be found very rich. Apricots, in like manner, may hang on the trees till they shrivel slightly, and when in that state no fruit grown in England can equal them in richness and juiciness. Apricots on walls, generally ripened thoroughly on one side only, are very inferior in comparison. I ought not to omit to mention, that many peaches that fall off when just on the point of ripening, but not ripe enough to eat, make excellent peach jam.

Peaches and nectarines must be very lightly touched on the projection immediately round the stalk; the operator will not gain this knowledge without practice, but when the fruit is ready, and in a good state to gather, the flesh yields to the lightest touch, and has a streaked and oily look; it is then ripe, and fit for Olympus. To gather to send away for presents to friends—and what present is more acceptable—the donor must not wait for this tempting appearance, but must pluck hardily while the fruit is yet hard; this is a Lenten task.

ON RAISING PEACHES, NECTARINES, AND APRICOTS FROM SEED OR 'STONES.'

Of all the interesting matters connected with orchard-house culture, I know of nothing of greater charm than raising the young trees from the stones of the fruit eaten some warm morning or at noon or eve. I mention these periods because the lover of fruits may be then in his or her garden, and not at the dessert, where fruits are eaten, and, in my opinion, without much interest being attached to them, their names, or qualities. Now, in the morning, say between 9 and 10, nature is fresh, and the flavour of fruit gathered from the trees is more exquisite than at any other season; in this opinion I differ from those who have not had my experience. Well, let us reckon that a very early kind of peach has just been eaten; its merits discussed, a wish may perhaps arise in the eater to improve this particular kind, or perhaps to disimprove it, as chance may direct. The method in all cases is at once to plant the stone or stones into a 6 or 8-inch pot filled with mould, placing the name of the sort of peach, nectarine, apricot, or plum, whence it was taken; thus, if the first, you may write on the label to be placed in the pot, 'from Early Rivers's peach, July 20, 1870,' and so on with the stones of other kinds, thus giving the origin of each particular kind. The stone will, or ought to be a plant the following March, and not before, unless forced. The knowledge of the origin of a seedling tree adds immensely to its interest.

When the flower-pot filled with mould and the stone or stones planted in the mould to nearly two inches in depth, it should have water, and some four or five inches of new cocoa-nut fibre piled over the mould, and the pot or pots plunged nearly to the rim in the orchard-house, where they may remain all the winter, the cocoa-nut fibre, or ashes, or any light material, being renewed when it sinks from being watered. In the watering the seed pots they should have the same treatment as recommended for the trees pp. 210–220.

In March the covers should be removed, the mould watered, and the young trees will soon appear, rejoicing—as all things do in spring—and making the heart of the sower happy. In the month of May the young trees should be transplanted into 6-inch pots, and towards July into 8-inch pots; they will by the end of summer, if kept in the 6-inch, attain a height of some three or four feet, and if placed in 9 or 10-inch pots the following year, they may remain in them till they commence to bear fruit, which will be from the fourth to the seventh year of their age. It should be recollected by the tyro, that a fruit rarely reproduces itself from seed, so that if you sow twenty stones of the Royal George peach no two would be alike, but each would have some difference. It happens that some kinds nearly reproduce themselves from seed; this is the case with the Noblesse peach, and some of the yellow fleshed peaches, but even then there is nearly always some minute difference either in the glands or size of the flowers, or something, as if nature would not repeat herself.

Seedling peaches, nectarines, apricots, and plums should be trained as pyramids, under which form they take up but little room in the house; the plums may grow out of doors till blossom time, and then be removed to the house to secure them from frost.

I can scarcely tell the interest felt here in seedling fruits; there are thousands of seedling pears and plums, a great number of them from hybridised flowers, and many hundreds of peaches, nectarines and apricots, great numbers of which are bearing fruit. It is most gratifying to me to find the early kinds raised but a few years since sustaining their characters so well. Thus, Early Beatrice ripened July 8 ; Early Louise, July 12 ; Early Rivers, July 16, of the year 1878, in a common orchard-house. The seedlings raised from these varieties may be improved in size and flavour, many trees raised from them are nearly in a bearing state. To give the reader an idea of the pleasing uncertainty of raising seedling fruits, and that a stone from Early Beatrice may produce an October peach, I may mention that a large peach here raised from the Early York peach some years since, is a fine late sort, ripening early in October; the cultivator may also expect nectarine trees from peach stones, and peach trees from nectarine stones. Plums and cherries vary to a great extent when raised from stones, and are most interesting; they, in common with peaches, nectarines, and apricots, should be grown in pots in the orchard-house, where they will commence to bear at about four years old.

A hard-hearted cultivator must select the seeds for the production of new varieties, he must choose the finest and best flavoured fruit, as no seedlings must be raised from inferior fruit; it is to the credit of human nature, that the best fruit is selected for gifts, and the possible result of a seedling is so remote, while the pleasure of giving a delicious fruit is so evident, that it is difficult to exercise the self-denial necessary for the occasional sacrifice of the finest specimens.

TEMPORARY HEATING.

During the months of March, April, and May, the frosts are sometimes very severe, and glass without artificial heat is incompetent to preserve the trees from injury by frost. Pans of charcoal will keep out frost in small houses, but in large houses, owing to the construction, it is necessary to adopt some complete method. In my house, 100 feet by 24 feet, I use about 150 feet of 3-inch piping, heated by a small stove, of which many kinds are powerful enough to heat this length; the funnel must be passed through the roof, a pane of glass being taken out for the purpose, and the pipes fitted into each other with vulcanised India-rubber washers. The whole apparatus may be easily fitted and taken to pieces; the flow and return pipes may be taken up the centre of the house, and the trees for the centre border placed on each side of the pipes, or the pipes may be taken on the sides of the walks. If placed in the centre one elbow only will be required, effecting a small saving. I support the pipes on bricks. When all danger of frost is passed, the pipes are removed for the summer. A temporary heating apparatus of this nature, which will last for years, will remove all fear of mischief from frost. For small houses many stoves are advertised which will no doubt answer the purpose required, but as it is impossible to try all, some faith must be placed in the representations of the vendors.

PLUMS.

THE PLUM is a charming fruit not sufficiently appreciated; it is in season from July to November, and is excellent for preserves and for compotes. And then how delicious are many of its varieties as dessert fruit! For the orchard-house it is also well adapted; the early varieties ripen very early; the late kinds may be kept in muslin bags all through November; they shrivel in the dry climate, and are perfectly delicious. I have had some of Coe's Golden Drop in muslin bags on the trees, partaking of the flavour of those called 'French plums,' but richer and more agreeable.

Plums for potting may be grafted on the sloe (*Prunus spinosa*), but they are equally prolific when grafted on the plum-stock: if they have been moved the year previous to potting, they will be full of blossom-buds, and will bear a good crop the first season; if they can be procured already established in pots, the crop will be better and the fruit larger. The same compost and the same treatment recommended for apricots will do for plums; the same potting, pinching, and pruning, so as to make the trees nicely shaped, compact, and dwarf, is all that is necessary.

In selecting varieties some care is required, so as to have plums all through the summer and autumn. The very early and very late plums in the South of England seem to ripen in the orchard-house without any loss of flavour; but the mid-season plums—such as the Green Gage, De Montfort, and, I may add, the Jefferson—are, I think, improved in flavour by being ripened in the open air. About the end of June they should be removed to some warm and sheltered situation. Their flavour is, I think, made more piquant by this treatment; and their removal will give more room to the peaches and nectarines. In wet and moist climates, where the Green Gage ripens with difficulty, they must remain under glass all the summer.

And now to our selection. For the first, take the Early Favourite and Early Prolific, two most excellent sorts, which ripen about the middle of July, nearly as soon as the Jaune Hâtive, a very early but very inferior plum; next in succession come the Czar; the Early Orleans; the Early Transparent Gage; the De Montfort; the Denniston's Superb; and the Early Green Gage; the Sultan; the Oullin Golden Gage; the Transparent Gage; the Green Gage; Belgian Purple; the Jefferson (rich and delicious it is); the McLaughlin Gage; Purple Gage; Reine Claude de Bavay; Coe's Golden Drop; Ickworth Impératrice; the Late Black Orleans; the Late Rivers, and the Grand Duke:[1] all these are excellent, and ripen nearly in succession as I have placed them. A very nice way of keeping the autumn plums, or, indeed, those that ripen in summer, from wasps and flies, is to form the trees into compact bushes, which may be enclosed, when bearing fruit, in a muslin or tiffany bag, tying it tightly round the stem of the tree, so as to exclude the ants, which are great pests in dry and pleasant places. I have only to remark that the plum in orchard-houses will to a certainty always give abundant crops, and as certainly ripen its fruit: in short, its culture will be sure to give satisfaction to those who love gardening.

---

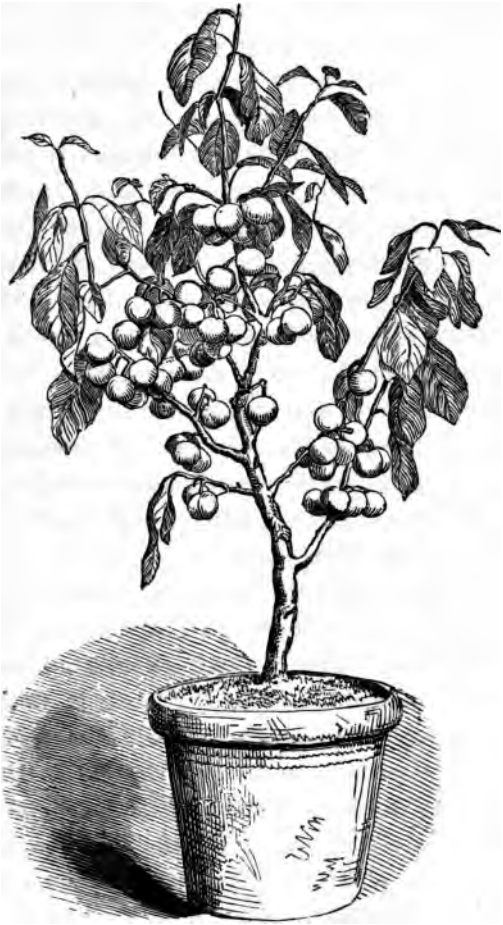
[1] The fruit catalogue contains many other varieties all of great excellence, too many to enumerate here.

PLUM-TREE HOUSES.

After some years of experience, I have found that plums are very easily grown in pots. It is well known that plum-trees in our climate bloom so early in spring as to be much injured by our spring frosts; it may safely be asserted that a fair crop of Green Gages, away from walls, is realised but three years out of seven, even in the South of England, but two years out of seven in the Midland counties, and seldom or never in Yorkshire. Now, I propose that, for those who wish to grow a regular and certain crop of plums without incurring a heavy expense, rough-built lean-to or boarded span-roofed orchard-houses should be erected in some out-of-the-way corner of the premises, consisting of larch-poles, rough half-inch boards, with two or three sliding shutters for ventilation—in fact, merely a glass-roofed shed on purpose for protecting plum-trees in pots while in blossom and setting their fruit. It is surprising with what vigour and beauty plum-trees blossom even in the rudest glass structure; and as the trees need not remain in the house longer than the end of the first week in June—for then all danger of severe spring frosts is over—they may be placed so close together, that a house 20 feet by 12, with a path in its centre, will hold ninety-six trees, forty-eight on each border. The trees may be planted in 13 or 15-inch pots, and treated exactly as other orchard-house trees, with this difference—all the trees having young fruit should be removed from the house on June 7, and placed in rows or otherwise in the garden to ripen their fruit in the open air. The pots may be plunged in the soil one-third of their depth, but not more; for if the roots are too cold the fruit will suffer in flavour; and if the soil in which they are plunged be wet and cold, it should be drained or made porous, so that the water may pass from the pots rapidly: the top-dressing of manure must be most abundant. As a matter of course, the very late plums must be ripened under glass; but all those varieties that ripen in the open air before the beginning of September may be placed there to ripen their fruit, which they will do perfectly: regular annual crops may thus be insured, if care be taken to thin the fruit properly. If too large a crop be extorted, the tree *will* take a year's rest.

It is quite astonishing how prolific pyramid and bush plum-trees become in a few years; and, by merely

FIG. 20.



Green Gage. 74 fruit.

(From a Photograph taken at Gishurst Cottage, Weybridge Heath.)

pinching off the ends of all their shoots to three leaves, they soon form themselves into compact trees, and very ornamental when grown as pyramids and placed in an avenue leading to the house for their summer quarters.

The best varieties for this extended mode of plum cultivation in pots are—the Early Prolific; the Czar; Early Orleans; the Early Transparent Gage; De Montfort; Early Green Gage; Transparent Gage; Denniston's Superb; Green Gage; Angelina Burdett; Kirke's; Guthrie's Late Green; Reine Claude de Bavay; Purple Gage; the Coe's Golden Drop; the Grand Duke, and, above all, the Jefferson, one of the most beautiful and delicious of plums. These are for the dessert; but, as in some climates it may be necessary to grow plums in the same way for culinary purposes, I may as well give the names of a few good kitchen plums: such are the Victoria and Autumn Compote, both large and excellent, ripening in succession; the Diamond; the Early Orleans; White Magnum Bonum; the Mirabelle; Prince Englebert, and the Sultan. The trees must all be removed to the orchard-house the last week in October, top-dressed, watered, some hay placed over them to protect their roots from frost, and then kept dry all the winter. As the earth of these out-of-doors orchard-house trees becomes very firm by the heavy rains of summer, the iron pick (fig. 14, p. 88), to take out the mould in autumn, will be found very useful. I have given a sketch in p. 88 of one which I had made by the village blacksmith. I may add that, as plums are coarse feeders, I take the surface earth out in autumn to the depth of 6 inches at the side of the pot, sloping upwards to the stem, so as to be able to give them a large quantity of fresh compost.

By those who wish to grow plums under glass in large quantities, another very simple mode of culture may be practised—viz., planting a house with pyramids or half-standards, and removing them biennially to check their growth. (Half-standard plum-trees are most prolific, and very convenient to manage.) One of our most skilful gardeners treats them in this manner, and finds that, after a few years, owing to the trees being every season loaded with fruit, they do not require removal, as they grow very slowly. When cultivated as pyramids in the orchard-house, they should be managed and pruned as directed for apricots in p. 56; they should, however, be pinched to three leaves instead of five, as recommended for apricots; and when cultivated as bushes, summer pinching to three leaves will be found by far the best method of pruning.

CHERRIES.

THE Mahaleb Cherry (*Cerasus Mahaleb*), Bois de Sainte Lucie or Perfumed Cherry, has been long employed on the Continent as a stock for dwarf cherries ; it will grow well in calcareous and shallow soils, unfavourable to the common cherry-stock. It is a very good stock for trees for potting ; when grafted or budded on it, they form beautiful dwarf bushes: the May Duke and Morello cherries, of which there are several varieties, do much better on it than the Bigarreaus and Hearts, which are apt to gum, and grow too rapidly in proportion to the stock. Cherries are well known to be difficult to force, or to grow under glass. The blossoms generally fall without setting their fruit, but in our well-ventilated orchard-houses this is not the case.

Their potting, compost, and treatment may be exactly the same as that recommended for apricots: the trees should be formed into a nicely-shaped bush, with regular divergent branches : on each branch the shoots, all but one leader, must be pinched back in summer to three leaves, and the leading shoot shortened in August to about six inches, till the tree attains the size desired; the leader may then be shortened to 1 inch annually, and the branches thinned when they become too crowded. It should be borne in mind that cherry-trees in pots under glass bear too abundantly and kill themselves unless severely thinned. Duplicate trees should always be kept. The best early cherries for the orchard house are—the Empress Eugénie; the May Duke; the Archduke; the Duchesse de Palluau; the Royal Duke; and the New Royal, a very large and fine sort—which ripen in succession. Then of the Heart Cherries and Bigarreaus, the very earliest of all is the Early Rivers, closely followed by the Early Lyons: then the Early Black Bigarreau; Early Red Bigarreau; Governor Wood; Knight's Early Black; Bigarreau noir de Schmidt; Large Black Bigarreau; Bohemian Black Bigarreau; the Black Eagle; Elton; Bigarreau Napoléon; the Bigarreau; and the Florence. I have placed them as nearly as possible in the order of their ripening. Of late cherries of the Morello tribe, which succeed admirably as dwarf bushes, there are: the Late Duke, also sweet, and of the highest excellence; Planchoury, Transparent, Coe's Late Carnation, a most delicious late Cherry; and the Morello, which, when fully ripe and black in September, is not to be despised as a dessert fruit. All these may be made to supply the dessert through August, September, and indeed great part of October, by enclosing each bush in a muslin bag, tied tightly round the stem near the ground: the dry air preserves them from mould, and the warm climate gives them a flavour very superior to that of late cherries matted up against walls, or indeed cultivated in any other mode. Cherries under glass are very liable to the attacks of the black aphis. There are two remedies for this pest: brushing the shoots with quassia-water; fumigating the house with tobacco-paper; or, when only a few trees are cultivated, covering the bush with a sheet of tiffany or calico, and placing ignited tobacco-paper in a small flower-pot under it, so that the draught through the aperture at bottom is open. This is a good method of fumigation.

CHERRY-TREE HOUSES.

In wooded districts it is almost impossible to taste cherries fully ripe, so numerous and destructive are birds: in such places cheap orchard-houses[1] might be built for their sole culture. They grow remarkably well in pots, and in a few years become most fruitful, every spur giving a bunch of blossoms; nothing can be imagined more cheerful than a cherry orchard-house when the trees are in full bloom in April and May. Pyramidal cherries, either in pots, or, if planted in the borders of orchard-houses, and pinched to three leaves —by which must be understood that every young shoot (all through the spring and summer), as soon as it has made four or five leaves, should be pinched to three— cannot be too highly recommended for orchard-house culture, for they soon grow into beautiful and fruitful trees. I scarcely know any fruit-tree more charming than a May Duke or Empress Eugénie cherry-tree, with its shoots pinched so as to form a compact pyramid covered with fine ripe crimson fruit. Cherry-trees for *planting* in the borders of an orchard-house should be grafted on the Mahaleb cherry, as it gives them a dwarf prolific habit; none but those of the Duke and Morello tribes are adapted to this purpose. The Bigarreau and Heart cherries are so vigorous in their growth that pot-culture for them is absolutely necessary.[1]

---

[1] The small span-roofed house is to be preferred for a cherry-house, as fumigation, so often required for cherry-trees under glass, can be performed efficiently.

The Bigarreau and Guigne tribes of cherries are supposed to be impatient of the knife, and out-of-doors they require skilful and special pruning. Under glass they may be pruned without fear, both in spring and summer. When arrived at the age of fruit-bearing, little pruning is required, owing to the excessive crops produced annually. As a general rule, the first spring pinching should be to the fifth fully developed bud from the base of the shoot; further pinching must be modified by the growth of the tree.

I may add that no description of orchard-house culture has given me more satisfaction than cherries in my cherry-house. I have had fine ripe fruit of the Early Purple Guigne on the 28th of May, followed by early and late sorts, all through June, July, and August, thus giving this delicious fruit fully three months. If wasps abound in August, the trees should be enclosed in bags of tiffany.

---

[1] I have recently discovered that trees of these tribes of cherries when double-grafted on the May Duke or Morello become most prolific.

My large pyramids of the Large Black Bigarreau and Black Tartarian cherries, covered with their fine fruit, have been for some years pictures of beauty.

My cherry-trees were so beautiful in 1878 that I sent several of the trees to the Royal Horticultural Society. To my great surprise and gratification, I was awarded the gold Knightian medal. Unhappily, my trees suffered so much from the jolting on the road to London and back, that they were no longer things of beauty on their return. The tender and delicate fruit was discoloured and bruised. The difficulty of sending fruit ripe on trees to the exhibitions in London is almost insuperable; half ripe fruit is not fit to exhibit, but ripe fruit on the trees will not bear the carriage.

Few fruit-trees repay the orchard-house cultivator so generously as the cherry; it is the first to give fruit, and also may be, with good management, almost the last. As a matter of fact, it is almost hopeless to expect fruit from cherry-trees in gardens. No sooner does the fruit begin to colour, than it is attacked both by large and small birds; and there is small difference to the grower whether the fruit is taken wholesale by jays, rooks, and missel-thrushes, or whether it is destroyed by the small slice taken out of the ripe side by a flycatcher. In an orchard-house these robbers are kept out by netting. The house must be well ventilated, but every opening must be netted as soon as the fruit begins to colour.

FIGS.

THE FIG is not a general favourite; but to those who like them their cultivation in the orchard-house is interesting and most simple.

Figs may be planted in the compost already recommended, and in pots of the same size, top-dressed in spring, syringed in summer, and put to rest in autumn, and treated exactly as other orchard-house fruit-trees. Although fig-trees against walls require protection from the frost—which would otherwise destroy the young fruit which is the first to ripen in early summer—yet under glass, with the mould perfectly dry and the shoots thoroughly ripened, they are uninjured by the most severe cold. If a well-formed bush cannot be procured, the tree must be cut down the first season to within 9 inches of its base; the shoots, when they make their appearance, thinned out to five: when these are about a foot in length, pinch off the end from four, leaving the central shoot for a fortnight or so to grow longer; then pinch off its end in the same manner. Your bush will be formed, but you must not expect any fruit the first season. In succeeding seasons it must be pruned in the same manner that you would a bearing tree purchased and placed at once in the house, *i.e.* in May or the beginning of June, as soon as the young shoots have made five leaves, pinch out the terminal bud of each: they will then give fruit for a second crop, the first crop having been produced by the shoots of the preceding year. And to keep your trees as compact bushes, as soon as a shoot has made five leaves, pinch out the terminal bud with the nails of the finger and thumb. The tree will, in a few years, become too much crowded with young shoots; they must then be thinned out with a sharp knife, leaving no spurs, but cut close to the main branch or stem. Figs like more heat than any other fruit yet mentioned: they should have the warmest corner of the house, not requiring much ventilation. A house with fire-heat is indeed necessary for them if two crops in the season be wished for. In a warm summer figs in common orchard-houses will ripen two crops of fruit. They must have abundance of water, or the fruit will all drop when nearly fully grown, without ripening. The varieties best adapted for pot-culture are—the Early Violet, the White Marseilles, and the Brown Turkey, or Lee's Perpetual: if more varieties be required, the sorts named in the list of fruits will be found worthy of cultivation.

In the fig-house of a neighbour, heated by hot water, the first-named sort has given three crops in one season, the last ripening in November. It is a small sort, not rich, but very nice. In common orchard-houses the second crop of figs is generally abundant; to insure its ripening, the tree should be removed to the forcing-house early in September, and have gentle heat to ripen the crop in October and November.

A very successful method of growing figs in pots when heat is used is to grow the plants in 15-inch pots, to plunge them to their rims, and then to keep the surface of the pots covered with rich manure to 2 or 3 inches in depth all the summer till the fruit is perfected; the trees should be kept pinched in, as directed p. 128, and if sufficient heat is used two large crops of figs may be gathered by the end of July.

To those who have not much orchard-house room, the following method of growing figs may be useful. In the kitchen-garden of the castle at Altenburgh, the capital of the Duchy, were some fine half-standard fig-trees with very stout clear stems and round heads full of fruit, nearly full grown in August. Aware of the coldness of the climate, the thermometer often descending many degrees below zero in winter, so as to kill fig-trees in the open air, special treatment seemed necessary. The gardener stated that every season, in October, they were taken up with their balls of earth and placed in a cellar, where they remained till the first week in May; they were then brought into the kitchen-garden and planted in a row. He said they always ripened one abundant crop of fruit in September. There is reason to believe that standard figs treated in this way would also ripen one crop in the neighbourhood of London, so that every suburban garden may boast of its fig-tree in summer. In the eastern and southern counties they may be cultivated after this manner with a certainty of success.

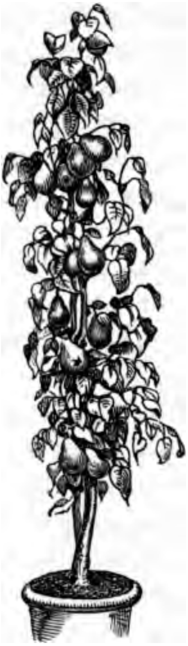
PEARS.

It is now several years since this mode of culture for pears was first recommended, at first with some little hesitation, because in some cases the fruit of pears ripened under glass was not equal to that gathered from trees in the open air; and there was a tendency to allow the trees to stand in the orchard-house till their fruit was ripe.

It is an irksome task to remove trees with fine fruit on them, from calm and pleasant quarters, although in the warmer parts of England quite necessary to give piquancy of flavour, but great advantages are derived from pear-culture under glass.

The best kind of compost for the pot-culture of pear-trees is two-thirds loam (that called sandy loam is to be preferred) and one-third of manure thoroughly decomposed. This should be mixed and prepared towards the end of summer, and about the middle of September be removed to a shed; so that towards the end of October, when the trees should be potted, the compost may be in a proper state as regards dryness. If a considerable number of trees are proposed to be cultivated, the No. 8 or 11-inch pot is to be preferred, as that is a portable size, which must be taken into consideration, as the trees are destined to be removed twice a year.

FIG. 21.



A Pyramid of the Louise Bonne of Jersey Pear.
(From a Photograph.)

In potting, the compost should be well shaken into the mass of fibrous roots; and when the pot is filled to about three-fourths of its depth, it should be rammed firmly down with a stout stick, and the pot then filled up, another ramming being given so as to leave the surface concave. Water should then be poured gently on till it soaks through and through the mould, and the operation may be considered as finished.

The kind of pears to be selected for pot-culture are pyramids, grafted or budded on the quince stock. These, if they have been well managed in the nursery, will be full of blossom buds, and their roots masses of fibres, so that, to use an old-fashioned gardening expression, they 'will not miss their moving'—which I presume is to be interpreted, 'their removal will not retard their growth.'

They will in truth, if potted in November or early in December, bear a nice crop the following season. As soon as the trees are potted, they should be stowed as thickly as possible, and the pots covered with leaves or litter to some 5 or 6 inches in depth. This will keep the mould in a proper state of moisture, and prevent injury from frost. If trees three or four years old are potted they may be expected to bear nice, although not full crops, till some six or seven years old.

Their routine culture should be as follows:—They may remain undisturbed with their protection of leaves or litter till the end of March, when it should be removed, and the trees have a good supply of water, and be removed to the orchard-house if not placed there when potted. This treatment applies not only to freshly potted trees, but to those already established. Although the trees are so close that their pots touch each other, they may be suffered to bloom and set their fruit without being moved. As the pear does not put forth its leaves to any extent till long after the fruit is set, no injurious crowding takes place.

About the end of the first week in June, when in the greater portion of England spring frosts are over, all the trees should be removed from the orchard-house to their summer quarters, which would be some sunny place near the orchard-house. If the soil be moist and tenacious, the pots should be plunged to only two-thirds of their depth, and then covered with some light half-decayed manure to about 2 or 3 inches deep. Care must be taken that the soil into which the pots are plunged is thoroughly well drained, and the water does not settle at the base of the pot.

If the soil of the summer quarters be dry and light the pots may be plunged to their rims, and the surface of each pot covered with decomposed manure saturated with liquid manure to 2 inches in depth; and then, if the weather be hot and dry, the whole of the border in which the pots are plunged should be covered with short half-decayed manure, or anything like it, so that but little water may be required.

During the summer the fruit should be thinned, for owing to the kind nature of the climate in which the trees blossomed, the fruit will set in large clusters, and if not thinned will give pears inferior or worthless. A tree the second year of its potted life may be suffered to bear one dozen of pears; in the third year from a dozen and a quarter to a dozen and a half. As a rule, a tree in an 11-inch pot should not be allowed to bear more than two dozen of pears of ordinary size, and if large kinds, seldom or never more than one and a half-dozen.

The pot culture of pear-trees is so simple and so safe in its results, that it must and will progress; so that in a few years people who annually have crops of fine pears with the assistance of glass, will look with wonder on the dark ages of pear culture, when the crop entirely depended on the mildness or the converse of our springs—if mild, pears; if frosty, no pears.

It was, I think, about the year 1845, that the late Dr. Lindley said in a half-triumphant manner—we had had several consecutive fruitful seasons—'Who will now say that England is not a good fruit country?' Alas for the short-lived triumph! In 1853, the record was: 'Summer cold and unfavourable; no pears, no plums, no cherries, no apples; this being the seventh consecutive year of failure in the crop of fruit in the south of England.' In 1854 again no fruit; then came 1855 with abundance, followed since then by more or less favourable years; 1866 and 1867 must be placed among the years of scarcity; and owing to the failure of these seasons, my attention was more closely drawn to my pear-trees in pots, which, owing to having been under glass while in bloom, and thus escaping the spring frosts, bore abundantly.

The economical method of stowage of pear-trees in pots in orchard-houses, or in common glass-roofed sheds, gives value to this species of culture. A span-roofed house with boarded sides and ends, and shutters on hinges 2 feet wide, opening downwards in each side for ventilation, is a cheap structure. Its sides should be 5 feet high, and its centre from 12 to 14 feet in height.

A house of this description may be strongly built with oak posts to support the side plates, and its roof supported inside by 2-inch gas pipes, at a small cost. From what has been done here, a house of the above height, 100 feet long, and 24 feet wide, ought not to cost more than from 170*l*. to 180*l*., for it must be recollected there is no glass used but for the roof. A house of these dimensions will allow of the stowage of two thousand pear-trees in 11-inch pots, having a border in the centre, two side borders, and two narrow paths to give facility to attend to the trees. In round numbers, the area of the house being 2,400 feet, 2,000 feet will be taken up with two thousand 11-inch pots, leaving a margin of 400 feet for the paths.

It is true that smaller houses may be built; but from experience in the culture of pyramidal pear-trees in pots, such houses should not be of a less height than 12 to 14 feet in the centre and 5 feet at the sides. Pear-trees under glass often bloom early in April, and unless the house they are in is lofty, one of our extra-severe spring frosts may come and destroy the blossoms.

The injury, it is true, may be prevented by using pans of charcoal, as in orchard-houses; but the end to be attained in pear culture is security without much care, and this is best attained by having the house large and lofty, so as to contain a large body of heated air after a sunny day in spring, succeeded by a severe frost at night.

Being much struck the past season by the size and beauty of the pears grown here on trees in pots, it led to a calculation as to the profit that might be derived from it as a commercial speculation. The result of the calculation was extraordinary. Pear-trees on quince stocks, trained as pyramids, five years old, and from 5 to 6 feet in height, of such large pears as Glou Morceau, Doyenne du Comice, Beurre Diel, Duchesse d'Angoulême, and many others of the same size averaged from twelve to eighteen each, the fruit remarkable for their bright colours and clear rinds, without a spot or blemish.

Fine and well-grown large pears during the winter months, at a low average, are worth 3*s.* a dozen. So that from 2,000 trees, always safe from storms and frosts while in bloom, we may estimate an annual crop of 2,500 dozens of pears. This may, when the trees attain the age of seven or ten years, be put down 3,500 dozens. When it is considered that 1,000 dozens of pears are worth 150*l*., it will be seen that a house of pears may be made a source of profit. I firmly believe that with Hamburg grapes planted 6 feet apart, instead of 12 as mine are, an industrious man may make a sure and handsome profit from a house 100 feet by 24.

So much for growing pears commercially, for which purpose only large and good pears should be cultivated. Their size and quality will equal those imported from France. Small pears, however delicious, are useless for market, and should be grown by amateurs only.

The labour required by a large number of pear-trees is not heavy, the routine of culture being as follows, which I give in the form of a calendar:

1.—The trees should have their surface soil renewed a depth of three inches towards the end of October, and the pots stowed thickly by the last week. They should then have a soaking of water, and be covered with leaves, as is before mentioned.

2.—About the middle of March, unless the weather be very severe, they should be uncovered, and if not placed in the house in the autumn they should now be removed there, and after their abstinence of four months, have a moderate supply of water. While in bloom, if the weather be mild, the side shutters and doors may be open night and day; if frosty, by day only. Instead of top-dressing or renewing the soil in October, it will be a saving of labour to treat pear-trees in pots after the manner recommended for apricots—*i.e.*, to allow the surface of the mould in the pots to remain undisturbed till after the trees have set their fruit; and on their removal to their summer quarters, to scrape off a small portion of it, say to the depth of one inch, and give the rich surface-dressing recommended. This intermission of the autumnal renewal of the surface soil may go on for two, three, or more years, or till the trees seem to require either top-dressing or repotting.

3.—The first week in June they should all be removed to their summer quarters, and the pots plunged. When the growth begins allow the first shoots to make from eight to ten leaves, and then pinch back to the fifth true bud from the base of the shoot, this will form the bearing branch for the next year, the first pinching is the most important, the next is to prevent irregular growth and to suppress in a measure too much vigour. The fruit must be thinned. This is of great consequence. At this season manure water will greatly benefit the fruit by increasing its size.

4.—During the winter, if any of the spurs on which the leaves have been pinched, have grown so as to make the tree irregular in shape, they should be shortened with a sharp knife.

Pyramidal pear-trees on quince stocks in pots make a very healthy but not a vigorous growth, so that they are easily kept in order by summer-pinching, and they soon form the most symmetrical and beautiful of fruit trees. Owing to the early blossoming of pear-trees under glass, the season of growth in the fruit is much prolonged, hence its increase in size; but its ripening period is not hastened. This is the case with pears in the warmer parts of France. They have a longer period to grow in than English pears in the open air under ordinary circumstances; but as a rule, they do not ripen earlier, or, as in the case of Easter Beurre, not so early, for this kind of pear is often in fine order in France till the end of April.

I must not omit repeating that the roof of the pear-tree house may be devoted to the growth of grapes, as the pear trees will be in their summer quarters before the vines have made much progress, so as to shade them injuriously. The pear-tree house may thus be a means of double profit. From what I have seen of my Hamburgh grapes trained on arches under the roof of my house, 100 feet by 24 feet, in which the pear trees were till June, I am sure they would pay. Indeed I am quite convinced that a house of this size would give a fair return to a clever cultivator.

The black Hamburgh vines alluded to have now (1879) been planted fourteen years; the arched iron rods are 12 feet apart, and the vines in full bearing, as they have been for several years past, and not only the arches, but a leading shoot from each vine is trained longitudinally under the apex of the roof. The effect is very beautiful, the house being 100 feet long by 24 feet wide. One very interesting fact attends these vines: no border was made in the house, but a hole the size of a peck measure was picked in the paths on both sides of the house at the foot of the columns, about a peck of compost, loam, and rotten dung, was put in, and some vines taken from the open borders were planted, having been cut down to two or three eyes: this was at the end of March. The first season they grew from seven to 10 feet, the next from 10 to 20 feet, and bore fine grapes; they are this season in the finest health and full of fruit, yet growing in a hard pathway, and the soil in the house, a hard calcareous clay, was dressed for the first time within ten years with rotten manure.

These vines doubtless derive benefit from the water which runs through the pots in which are young trees, surface-dressed. I acknowledge to having planted the vines in a fit of idleness, merely wishing to cover the pillars inside (two inch gas pipes), which support the roof of the house, and are six feet from each side, and 12 feet apart, and I confess that I had no idea that vines would grow and bear so well in a soil so solid, the *rationale* of which in common with that of the liking of other fruit trees for solid soils—more particularly of those that are called stone-fruits—I am entirely at a loss to solve. I only know that my peach trees grow and bear well, planted in an orchard-house in a solid border which is never stirred, and that my pear trees in the open ground grow equally well in an undug soil. I have mentioned the arches covered with vines being 12 feet apart; the spaces between the vines are now furnished with peach-trees, and as the shade is slight they do well; so that after the pears are removed early in June a great number of peach and nectarine trees in pots might be introduced to ripen their fruit in the house with the grapes.

The pear is almost a tradition here. For many years it has been a ceaseless object of care and cultivation; but until ample protection could be given, the reward of fruition has been like the rewards of authorship and art—not always commensurate with the skill and trouble given, or, at all events, not sufficient to satisfy the legitimate hopes of the speculator. With the artificial aid of glass, there is no reason to fear the destruction of the plans formed by the ardent amateur of pear production (no fruit, by the way, being more worthy of skill and care). Some of my pear-trees in pots are 8 to 10 feet high, without a single superfluous fruit bud; all of them pictures of fertility, and, I may say, all capable and willing to give the exact number of fruits that may be determined by the owner. They are in pots 18 inches high, and 18 inches in width; the house to shelter them must therefore be from 12 feet high and upwards in the centre, and they should be introduced into their sheltering quarters as soon as the blossom gives signs of expanding. As a rule, pear bloom is not injured readily by frost until it has burst the protecting scales by which the blossom is covered in winter; but as the trees have, according to my system, been grown in a border during the summer, it is possible, and to be desired, that the roots have passed from the pots into the surrounding soil; therefore, the moment the fruit is gathered, be careful to break all these roots by lifting the pot. This treatment must be pursued for the trees from which the fruit has been gathered in summer as well as the autumn; with the former, as it is possible that fresh roots have passed into the soil after the fruit is plucked (there is no such thing as rest in trees), it will be necessary to remove them at the time of the autumn lifting. After the roots have been thus disturbed, leave the trees untouched in the borders until it is time to place them under protection. No winter will hurt the roots when they are plunged in the soil. Fifty trees, 10 feet high and 4 feet through, will give a good supply of fine fruit, and in many years will amply supply the table when the walls show returns like Turkish or Spanish securities.

Do not be persuaded to pot trees on the pear stock, but adhere strictly to the quince. All sorts of pears do not readily grow on the quince, but all sorts will grow when double grafted. Some of my finest trees are seedlings raised from the Louise Bonne of Jersey pear. One of the seedlings which I have offered to the public—the Princess—is a charming pot tree; it is an abundant giver of fruit, and is like its parent in form, colour and flavour, but ripening at Christmas instead of October. Another seedling from the Louise Bonne ripens in November. Another seedling, which I propose to name the Autocrat, is a fine variety for pot culture, sturdy and vigorous, ripening in November and December; this is a seedling from the Beurré de Capiaumont. These are all produced from pears grown under glass, and therefore hybridised.

It is hardly necessary to say that for pot-culture the sorts should be strictly confined to those that are large and handsome. For a selection I may suggest the following, arranged in their consecutive order of ripening:—Jargonelle, Beacon, Clapp's Favourite, Beurré de L'Assomption, Bon Chrétien (William's), Beurré Superfin, Souvenir du Congrès, Louise Bonne of Jersey, Marie Louise, Conseiller de la Cour, Grégoire Bourdillon, Glou Morceau, Doyenné du Comice, Pitmaston Duchess, Beurré Diel, Beurré Bachelier, Beurré d'Anjou, Princess, Winter Nelis, Josephine de Malines, Knight's Monarch, Marie Benoist, Iris Grégoire, Easter Beurré, Passe Crassane, Beurré Rance, Olivier de Serres, Doyenné d'Alençon. All these pears are good, large, and grow well. It must be remembered that north of the Trent many of the pears which ripen in November in the south of England will keep good till Christmas.

In all cases of cultivation undertaken for pear-growing on a large scale (and there is no limit to the number of trees which may be used, as the profit is certain), I should recommend the use of perforated pots, with annual root-pruning. If my idea is carried out with skill and energy, and a moderate expenditure of capital, there can be no reason to fear a legitimate return. An avenue of 50 or 100 trees, 10 feet in a garden, with the pots carefully concealed, and the trees full of fruit, is a sight that must be satisfactory both to gardener and the owner, and this can be produced year after year, with no more fear of failure than the fear of failure of a crop of cucumbers.

Some will object that the trees will not live for many years under this forcing treatment; these cavillers may be silenced by the unhesitating trial of the system. As a set-off to the expense of the house for protection, and the attention required in giving water and air to the trees which are under glass, I may say that the pruning when the trees are well under weigh with fruit is almost a nullity; the whole energy of the plant is expended in the production of fruit and fruit buds.

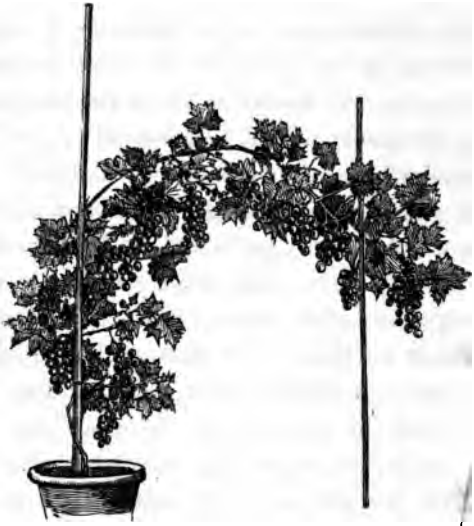
In order to have large trees, it is better to grow them for two or three years before potting, as the trees do not increase quickly in size when under pot culture. Therefore I should advise the purchase of a few dozen trees on the quince stock; plant them out in the ground and grow them for three years; then take them up and pot them. They must have one year in the pot without fruiting, and the second year after potting a fine fruitful tree will be established, capable and ready for a return for the care given.

GRAPES.

For some few years it has been the fashion for gardeners in lordly places to grow grape-vines in pots, which after bearing one crop of fruit, have been destroyed. Now these pots are generally of such large dimensions as to be quite out of character with our orchard-houses, and totally unfit for the amateur who wishes to be master 'of all he surveys.' By observing in the land of the vine that grapes, and good grapes, could be grown on very small bushes, and in crevices containing but a scanty portion of earth, I was induced to try their culture in comparatively small pots, without destroying them after giving their first produce, continuing their culture without shifting, but top-dressing them annually, suffering their roots to feed in the border during the summer, and then root-pruning and managing them in the same way as other orchard-house trees. This has succeeded admirably, and my vine-bushes have been beautiful objects, bearing from four to six bunches of nicely ripened grapes.

To form these bushes but little care is requisite; a vine one or two years from the eye, with a single stem must be selected, and potted into an 11-inch pot in the same compost as recommended for other fruit-trees, adding to each pot a quart of 1-inch bones, well mixed with the mould; then cut the vine down to within eight buds of its base; the three lower buds must go for nought; the five upper buds, if the wood be well ripened, will give each a bunch. The lower shoots should be stopped, their tops pinched off as soon as they are four inches long; the upper five shoots may be suffered to grow till the bunch be perceptible; these may then be stopped one bud above the bunch, and all lateral shoots that afterwards come forth may be stopped at two buds from the base of the shoot they spring from. No other pruning will be required during the first season than this finger-and-thumb pruning. It

FIG. 22.



A Photograph of a Black Hamburgh Grape Vine three years old.

is quite possible that some of the five buds may fail to give a bunch: no matter; stop them at the same length as the fruit-bearing shoots, so as to make a uniform pretty bush; for the vine in all sites and situations, and in all stages of its growth, is a beautiful object. You will now have an upright stem with five divergent shoots or spurs. Now, on the pruning of these spurs depends success; they will of course, from being grown under glass, be well ripened, and the buds well developed. Take one of these shoots, and count four or five shoots upwards; the fourth or fifth will, in all probability, be nice and plump. This must be your fruit-bud. Cut down to it closely; then with a sharp penknife *cut out* two or three buds, leaving the terminal bud and another at the base of the spur close to the stem. This will give you a shoot which is to be your fruit-bearing shoot for the following year. You will thus have on each spur two buds, one for fruit and the other for wood.

In autumn that part of the spur which has borne fruit must be cut down close to the shoot which is to bear fruit the following season, and this shoot must be pruned in the same manner to one fruit-bud and one shoot-bud. This pruning should be done early in October, as the buds are then fully developed, and much is gained by autumnal pruning. A vine treated thus will last for many years, and may be always kept as a dwarf bush; the main stem, in time, will swell and not require the support of a stick.

The first season the cultivator must be content with four or five bunches from the vine; but if the annual autumnal top-dressing of the composts described in p. 62 be given, and in summer a weekly supply of manure-water, it will soon be able to bear eight or ten bunches, and become like one of those hardy prolific bushes one often sees growing in the crevices of rocks in the wine countries of Europe, which, in spite of the rough pruning they receive, always bear abundance of fruit.

An orchard-house bush-vine, in the hands of an unskilful cultivator, may also be roughly pruned without any fear of losing a crop :—Shorten every shoot in autumn to three buds; and in the course of time, when there is too great a crowd of stumps, thin them out. A fruitful bush will thus be formed, much like the stumpy vines in use in the wine districts on the Continent.

After the fruit is set, vines require syringing like other orchard-house trees. As soon as the fruit is gathered, prune off the roots which have fed them so bountifully all the summer, top-dress them, withhold water, and put them to rest for the winter. I may add that vines do not need the extreme ventilation recommended for stone-fruits; a warm part of the orchard-house will suit them best; or if a small house with a stove can be entirely appropriated to them, so as to force them, and have two, or even three crops in the season, their culture will be most interesting. Vines in general do not succeed so well when placed among peaches and nectarines as when they have a department or a house to themselves. They do not require so much syringing or so much ventilation; in short, they require and like a warmer climate than stone-fruits. To do this, if forcing be commenced in January, put in one-third of your plants, early in March another third, and then in May the remainder. I do not hesitate to say that a house appropriated to vines in pots will give more fruit than the same space of glass with vines trained to rafters in the usual manner.

The varieties best adapted for this bush-culture are those that are very prolific; none are more so than the following:—The Early Smyrna; the Esperione; the Early Kientsheim; the Royal Muscadine; Primavis Frontignan; the Black Hamburg; and the Buckland Sweetwater, which gives large and most beautiful bunches. It must not be forgotten that the berries must all be thinned when they have attained the size of small peas, or they will become crowded and inferior.

VINES IN POTS ON HOT-WATER PIPES.

It is a fact generally known, that vines in pots can be cultivated more successfully when placed on a warm surface than on a cool one; but I have no recollection of ever having seen stated the amount of heat their room would bear. Wishing to test this, I was induced in January 1864 to try the rather hazardous experiment of placing some vines, forty in number, on a very hot place—the upper, or flow, 4-inch pipe used with others to heat a newly-constructed orange-house. I was encouraged to do this from recollecting a vivid description given me by a travelled friend of the luxuriance of vines he had seen growing and bearing fine fruit in mere crevices of the rocks in some of the islands in the Grecian Archipelago—more particularly, I think, in Paros.

He seemed to think that some of these vines had not more earth to grow in than one of our moderate-sized flower-pots would hold, and the heat he described as perfectly scorching: yet the vines flourished, and produced magnificent fruit. Be it as it may, my vines were placed in a row on the hot-water pipe, which I found reached a temperature varying from 130° to 150° and upwards; they were mostly in small (9-inch) pots, for I confess I only anticipated obtaining one or two bunches from each vine, merely to test the quality of their fruit, as they were new kinds. Each pot was supported by a piece of copper wire brought round it under the rim, and twisted round a nail driven into the wooden plate supporting the house, and the vines trained under the roof. Some of the earth was removed from each pot to about two inches in depth, and replaced with a compost, firmly rammed down, of horse-droppings and malt-dust saturated with liquid manure. The vines broke freely, showing one or two bunches at every bud; they ripened their fruit in May and June; it was of the most perfect flavour ever tasted, and the colour of the Frontignans and Muscats was of a beautifully bright amber. The vines, when it was seen that they would do well, were assisted with fresh compost by sticking pieces of slate round the pots, inside, to support it; they were watered twice or thrice a day, and obtained a vigour seldom or never seen with vines in such small pots; they were at the end of August growing vigorously, some of them having shoots which amounted in the aggregate to 40 feet. None of the roots were scorched, not even those that were coiled round the bottom of the pots. The exquisite flavour and beauty of the fruit was doubtless owing to the pots being on so hot a place, and also being fully exposed to the sun-heated air (often 95°) of the house. To keep down red spiders the vines were syringed twice a day, avoiding the fruit.

As this mode of growing grapes is perfectly sound, and no fear need be entertained of failure, such small pots as I commenced with should not be used, but 12 or 13 or 15-inch pots may be employed, and every spare 4-inch hot-water pipe may have its row of vines placed on it if any room can be found to train them. The rich surface-dressing above mentioned should be renewed two or three times during the growing period.

The great contrast between growing grapes in pots on hot-water pipes, every part of the pot exposed to a fierce dry heat, and growing them in large pots plunged in tan or some other moisture-giving material, will be apparent to all grape-growers: by the latter method, large bunches and berries of mediocre flavour may be obtained; by the former, berries and bunches equally large, with the highest possible flavour. Moreover, the vines ripen their shoots so thoroughly that they may be fruited several years in succession, merely by repotting them in the autumn, but when this is done, care should be taken in pruning not to cut in the spurs very close.

I have only to add that again this season (1878) the experiment with vines in 13-inch pots met with perfect success; the roots of the vines, from having, I presume, been assisted with abundant surface-dressings of horse-droppings and kiln-dust, came as it seemed instinctively to the surface to feed lustily upon this rich food.

In 1878 the vines on hot-water pipes are such a matter of routine that they have ceased to excite any curiosity. I have had abundant crops of fine grapes both late and early, and this season I have kept Mrs. Pince's Black Muscat for six months ripe on the canes, the grapes being delicious in flavour; and although the berries are irregular in size on the bunches, it is a grape well worth growing for flavour.

A very charming method of growing vines in large orchard-houses was published by Mr. Douglas, in the 'Journal of Horticulture.' At the foot of each pillar a vine—intended to be permanent—is placed in a 13-inch pot, and the cane coiled round the pillar. These vines should be pruned on the spur system, as mentioned p. 153; they will require top-dressing in autumn, and surface-dressing in summer, as recommended for other fruit trees, and once in two or three years they may require repotting.

For early summer grapes, the vines are placed on the pipes during January. I do not pretend to grow from these small pots (11-inch) large bunches for exhibition, but I confine the sorts to the delicious Frontignan varieties. These are comparatively small, but they are very easy to grow, and the *goût* is unexceptionable. Ripe in summer they will hang on the vines until November.

A VINEYARD UNDER GLASS.

SOME YEARS ago I was much struck with the vines in the gardens of the South of France trained to upright stakes about 6 feet high, which, as my visits were made towards the end of autumn, I saw season after season loaded with fruit. They were pruned on the spur system, somewhat after the manner of pruning now practised in our vineries, but not so close. I then planted some in a border at the back of a lean-to house with a beech hedge for its back wall, to try if it were possible to grow grapes after the same fashion under glass. They grew and bore well, but the hedge-house, I found, was too cold to ripen their fruit in all seasons; so they were taken up, and the idea passed from my mind, and the experiment was not carried out fully.

I can now, however, with the improvement that has taken place in building orchard-houses, safely recommend this very interesting mode of grape culture in a small span-roofed house 14 feet wide.

A house of this width and 30 feet long will hold 12 vines trained under the roof in the usual way, up one side and down the other. If, however, the vines are planted in the borders, and trained to upright iron rods 6 and 7 feet in height and at 30 inches apart, which will be found the proper distance, it will hold 48 vines planted in two rows; one row to be within 2 feet of the side, and trained to 6-feet rods; the other 4 feet from it next to the central path, and trained to 7-feet rods. Each border will thus serve for 24 vines. They should be pinched in summer and pruned in autumn, in the same manner as directed for bush-vines in pots (p. 156); or if the minutiæ of this mode of pruning be irksome to the amateur, he has merely when pruning in October to cut the shoot down to two eyes, not leaving more than two stumps (the pruned shoots) to each joint. The vine will have these all up the stem, at intervals of about 6 inches. I may mention that but little pruning science is required.

It is good practice to detach all the vines from their rods in the month of March, and lay them flat on the ground till the young shoots are 1 inch in length; they will then break with more vigour in the lower part of the stem.

It may be questioned if the vines will bear fruit from 'top to toe.' Perhaps the lower part of the stem may fail; still, if each vine gives fruit on only two-thirds of its height, the produce will, I doubt not, be much heavier than from vines trained under the roof in the same space. Twelve roof-vines may give 20 bunches each, or 240 in all—a most abundant crop. Forty-eight vines trained to rods may give, at 12 bunches each, 576 bunches, or an increase on roof-cultivation of nearly 100 per cent. There is besides this the pleasure of walking among one's vines, and of being able to train and prune and thin the bunches and berries without having the eyes strained by constantly looking upwards to the roof. The borders these upright vines are planted in should be well forked over to a depth of 20 inches, and be enriched with a dressing of manure, half-inch bones, and lime-rubbish well mixed with the soil in stirring it. I can imagine but few things more agreeable than walking in a vineyard under glass while the vines are in bloom and in fruit.

There is yet another mode of growing vines under glass which may be practised, instead of training them as pyramids—to make them into half-standards, with heads like other fruit-trees: these may be pinched in summer, and pruned in winter, so as to form round fruitful heads; or they may be trained over a wire-frame, so as to be ornamental as well as useful. Half-standard vines may be occasionally seen in gardens in France, in districts where the climate is warm enough to ripen the fruit, and a charming effect they have when loaded with their pendent purple bunches.

Strong growing and good bearing sorts should be chosen for this kind of culture, such as Black Hamburg, Trentham Black, Black Prince, Buckland Sweetwater, Chasselas Vibert, Royal Muscadine, Early Smyrna, Frontignan, Madresfield Court, &c.

In the 'Journal of Horticulture' for November, 1865, p. 384, a very pleasing description is given by W. T. Gage, Esq., of Williton, near Taunton, of his vineyard under glass. He wrote (October 10, 1867):—

'I predict that vineyards under glass will be more common than orchard-houses, because all amateurs are not good gardeners enough to make the latter thoroughly successful, whereas the vineyard is much less troublesome, is pretty and charming, and yields without fire-heat ripe grapes from August to January. The grapes of 1865 are far surpassed by those of this year. My heaviest bunches now weigh 28 oz., and the grapes have been exquisite in flavour. I seldom allow more than a dozen to fifteen bunches to remain on a bush or pyramid. To prevent the ground becoming too dry, and to enable me to leave off watering and syringing when the grapes begin to colour, I early in May covered the surface with horse-droppings, and on them placed a slight covering of reeds. This has answered well. All the shutters are opened before 7 A.M.; to get rid of the damp, a few are closed at 10 A.M., and the remainder at 4 P.M., to retain heat. The syringe is well used till the vines are in bloom, and afterwards as required, till the grapes begin to colour. I never allow the leaves of my pyramidal vines to touch the glass, as they are apt to scorch, and besides that, they keep out the light and sun-heat.'

I have only to add to this very satisfactory description, that the house is 30 feet by 14, and contained nearly 40 vines at 3 feet apart.

It is the custom here to syringe the vines once a day about 6 P.M., and in hot weather to sprinkle the paths once or twice a day. This practice keeps down red spider.

The 14-feet wide span-roofed orchard-house (see p. 19) seems to me the most eligible and agreeable of all for a vineyard under glass. It should stand endwise, north-east and south-west, so that the sun may shine all the morning on the south-east side, down the middle about one o'clock, and on the north-west side all the afternoon.

APPLES.

THERE are a few delicious American apples which require more sun and a drier climate than our 'tight little island' can boast, and these may be cultivated in the orchard-house with success. They should be grafted on the English Paradise stock, be planted in the same sized pots as other orchard-house trees, in the same compost, and have the same treatment recommended for apricots with regard to summer pinching both as pyramids and bushes.

Apples grown under glass develop a flavour and colour hardly ever attained in the open air, especially some English and American varieties; the best of these are the Cox's Orange Pippin, which I have seen almost as full of juice as an orange, with cells as fully developed as a nectarine and as rich in flavour; Ribston Pippin, rather hard, but very good; Golden Pippin, small but capital; the Scarlet Golden Pippin is as rich but larger and more brilliant in colour; Braddick's Nonpareil, and all the varieties of Nonpareil, of which there are many; Colville Blanche, the Pearmains, and King of the Pippins are among the best of the English apples; of the American apples—Newtown Pippin, Northern Spy, Mother, Reinette du Canada, the Melon, and the Washington are the best.

The trees require the same treatment as pears. Provide the fruit-buds by stopping the first summer growth at five buds from the base, after the shoot has made from nine to ten leaves; after the first stopping allow the growth for a time, generally about the end of July, and then repeat the pinching; with a tree full of fruit much summer pruning will not be necessary. I have recommended the removal of pears to the outer air during the summer, and for pears this is no doubt the best practice; apples, however, will endure the heat of a glass-house without any loss of flavour; on the contrary, it is developed to an extraordinary extent, and the fruit is very handsome in size and colour. The trees, because they are apples, and consequently not ranking among the aristocracy of fruit, must not be relegated to a shady and obscure corner; they require as much sun and as good a position as the peaches and nectarines, and must be fed with the same care; the more food the better the fruit, and it is worth the trouble.

The best stock for pot-culture is by far the Nonsuch Paradise; it has the property of emitting small fibres from every bud on the stem, and consequently has so much the more power of taking up nutriment. The dwarf French Paradise is not more fertile, and is much slower in making a fruit-bearing tree. The fruit given by the aid of the Nonsuch is remarkably brilliant in colour, and is very large and well formed. Although the French Paradise has been much used for pot-culture, I see no necessity for employing this stock, the Nonsuch being superior in all respects.

Apples grafted on the French Paradise stock are good orchard-house trees. It is too tender to bear the open air in England, unless the soil and site be very warm; but apples grafted and grown in pots under glass, form charming little *buissons*, the warm air of the house suiting well both stock and graft. An apple-tree house will soon be thought indispensable in the extreme north, and I hope one day to see orchard-houses on many a sunny slope in the Highlands; and why not? If art and wealth can overcome nature in making fruits grow instead of heather, the conquest will cause smiles rather than tears, and give a much greater amount of happiness than the 'glorious victories' of our history.

The Nonsuch Paradise stock is better than the French Paradise for pot-culture; it is more robust and produces finer and highly coloured fruit.

MULBERRIES, &c.

In many gardens this delicious fruit does not ripen kindly: in such localities dwarf trees, in pots, in a few years bear well, and ripen their fruit in great perfection.

The fruit of the mulberry generally ripens in the orchard-house from the 10th to the 15th of July, and continues until the middle of August, giving a supply of ripe and rich fruit, particularly sweet and good; in the northern districts it is a charming addition to the dessert, as the cultivation of this fruit out of doors is entirely restricted to the southern counties. The fruiting tree here is in an 18-inch pot, is most luxuriant in growth, and full of fruit remarkably fine and good.

I may also add that White Currants, which are seldom well ripened, and even then are very acid, may be grown to great perfection in pots under glass.

It seems hardly worth recommending Gooseberries in pots, but they are very fruitful and easily protected, and when grown as pyramids form remarkably prolific trees. The fruit of the high flavoured can be preserved on the tree for a long time; if placed in the open air they must be netted.

STRAWBERRIES.

On the back border of the lean-to orchard-house—for, unless the front be partially of glass, the front border will be too much shaded—spaces will be found for strawberries in pots, and they give much pleasure and satisfaction; their fruit will ripen about ten days before those from plants in the open air, and to a certainty will not be spoiled by rain or vermin. Whoever has tasted fruit of the 'British Queen,' grown under glass without being forced, will, I am sure, have a lively recollection of their being much higher flavoured than those generally gathered from strawberry beds.

Nothing in our orchard-house culture is so simple as the management of potted strawberries, and nothing will be so certain of agreeable results. About the middle of July take 6-inch pots (32's of the London potteries); place two or three large pieces of broken pots at the bottom, so as to lie hollow; then mix your compost, which should be two thirds loam—if rather stiff, the better—and one third rotten manure. You are so far prepared for operating, but you still lack an implement; and what a strange one in the hands of a gardener! for it is neither more nor less than a pestle—a wooden pestle, fashioned out of any stout stake, and perfectly rounded at the bottom. Now then take a handful of mould—nothing like the hand in potting—put it into your pot, and give it a good pounding, and so keep on with a handful and a pounding till your pot is full, quite level with the brim, for the earth will afterwards sink enough to retain water. You will thus, if you have done well, make your earth level with the brim, and as hard as a barn floor. Take the pots to your strawberry-beds and place on the centre of each pot a runner which has commenced to make roots (or if no roots be apparent it will do as well), and on the runner place a small stone, to keep it from being blown off by the wind. Make no hollow place: do nothing but place it on the hard surface as I have directed. If the weather be dry, water daily; and if the runner, as is often the case, pushes forth another runner, pinch it off. In two or three weeks the roots will have penetrated to the bottom of the pot: the plant may remain attached to its parent till the middle of September, and then all the pots may be removed to their winter quarters—some sunny place: they should be placed on rough cinders, and then plunged in sawdust or rotten tan. In February they may be removed to the orchard-house or forcing-house, as required—no shifting is requisite—and a plentiful crop will be the result.

Strawberry plants, treated in this manner, attain much strength and luxuriance in the autumn; their fruit buds will be finely developed, and they will be all that the gardener can wish them to be. This very simple mode of treating strawberries for culture under glass is not new: it was pointed out to me by a market-gardener some years ago. I have practised it ever since, and am more than ever pleased with it. In growing strawberries in pots, it is the usual practice to place them on shelves close to the glass, but they will do well placed on a border about 6 feet from the glass.

The best varieties for forcing are the Duke of Edinburgh, Early Prolific, Keen's Seedling, Sir Joseph Paxton, Dr. Hogg, Seedling Eliza, Vicomtesse Hericaut de Thury, Loxford Hall Seedling, President, and Sir Charles Napier.

Strawberries should be carefully watched in an orchard-house, and although the outlines of culture have been given, they are often more plague than profit, from the tendency of the plants to encourage red spider. When this pest has invaded the house it is troublesome to destroy; the plants should, if cultivated, be turned out immediately after the fruit is gathered.

The following extract from the 'Gardeners' Chronicle' of June 7, 1856, seems to give a very nice mode of cultivating strawberries in pots:—

'In the garden of the Horticultural Society, in the year 1855, Mr. Gordon caused runners to be taken up from the ordinary plants in the open borders in the first week in August, and potted in 2½ inch pots (small 60's); the soil used was a mixture of rotten cowdung and loam (quarter dung, three-quarters loam). When potted, they were placed in a close frame until established, and when the roots had filled the little pots, which was in about four or five weeks, the plants were shifted, in the same kind of soil as before, into 4-inch fruiting pots (48's). They were afterwards transferred to a fully-exposed situation in the open air, where they remained until the first week in December, at which time they were removed to a border in an unheated orchard-house, where they were kept rather dry during winter. On the 14th of March the pots were removed to the front shelf in a curvilinear vinery, kept at a temperature of 40° until the middle of April, when the temperature was raised to 55°. The plants were watered twice, when the fruit was fairly set, at an interval of three days, with a weak liquid manure, made with half-rotted cowdung and water, allowed to stand a few days before using. The result was an abundant crop of excellent fruit.'

ALMONDS.

To those who wish to be reminded of the 'sweet South,' by having almonds fresh and ripe from the tree, the orchard-house will give one more tribute. Almond-trees in pots require exactly the same treatment as peaches and nectarines, but the choice of the proper sorts is of consequence. The Sweet Almond in common cultivation, and which is so conspicuous in our shrubberies in

March, with its bright pink blossoms, is not the variety to be selected. The only sorts worthy of cultivation are the tender-shelled Almond ('Amande à coque tendre'), the large-fruited Almond ('Amande à très-gros fruit'), and the Princesse: the former has shells very tender, and easily broken with the fingers; the latter gives large fruit, with tender shells, it is also early. They require, however, even more air than peaches while in bloom; and if the weather be dry and sunny, they should be placed in the open air by day, removing them to the house at night. If this be inconvenient, they should be placed near one of the ventilators, which should be open night and day.

THE FORCING ORCHARD-HOUSE.

The house in which for the last three or four years peaches in pots have been forced here is a span-roof, 14 feet wide, 4½ feet at the sides, and 9 feet up to the ridge; the rafters are 24 inches apart, and it is glazed with 21-oz. glass. It is therefore very light and airy; the ventilators being at the sides, abundance of air can be at all times admitted. At intervals of 10 feet in the roof at the ridge, panes of glass are put into wooden frames; these constitute the roof-ventilation. With mechanical appliances, roof-ventilation is easy enough to make. The house is 150 feet long, and is heated by four rows of 4-inch pipes. It is perhaps too long for private families; but as the house is cheap, and easy to build, it may be divided into compartments, for vines and peaches, part being forced and part without forcing. The trees in-pots are placed 3 feet apart, and are usually introduced about the middle of December, heat being applied between this time and the first of January. The soil for potting has been already described. In a house with wide ventilators, air will be forced into the interior of the house by natural gravitation, and therefore, during January and February, except in exceptional weather, it is hardly necessary to be very anxious about ventilation. As a general rule, while the plants are developing the bloom the temperature should be kept between 35° and 40°; in sunshiny days it will rise without additional fire-heat to 55° and 60°, but in severe weather, of course, care must be taken to prevent it from falling below 35°. A few days of frosty weather will not retard the trees to any appreciable extent, and in this a lesson may be taken from the action of the climate out of doors. No matter at what time the trees bloom—and in some years there is a difference of a month—the fruit of trees ripening at a certain period will be found to ripen at the ordinary season. Some years since, owing to a very inclement spring, the pear Louise Bonne was not on bloom until the first week in May, but the first ripened at the usual time although the difference of the period of blooming was fully a month. This character should be taken into account in forcing. Allow the trees under artificial heat plenty of time to bloom and set their fruit; keep them gradually developing until the stone is formed, and then apply heat. There is little danger after this critical operation.

In all forcing-houses, and with all peach-trees, it is impossible to find the trees entirely free from the pest of peach-culture—the brown aphis; the trees must be carefully watched, and the slightest appearance of the aphis at once destroyed. Quassia-water and soft soap, applied as hot as the hand can bear it, will destroy the outward signs; but the germs are invisible, and it will be quite necessary to fumigate the house thoroughly. And by all means destroy all the ants; these clever little insects, who are delighted with a forcing-house, as it affords them fresh food in a barren season, will convey the ova of the aphides from other sources, and a house apparently free will in a few days be found to be thoroughly stocked through no fault of the cultivator.

Ants have also an extraordinary propensity for destroying the anthers. They will bite them close off at the base, and the surface of the pot is often covered with the remains of the severed stalks. As the stamens are absolutely necessary to the production of fruit, it is hardly necessary to say that this danger must be strictly guarded against. Fortunately the remedy is simple: rub a circle of chalk on the stem of the plant—the insect cannot surmount the rough surface—and pour carbolic acid into their nests in the soil.

A flue may be employed for houses under 50 feet in length, and 12 or 14 feet wide, efficiently; but not, I think, for houses above that length. Any country bricklayer can build one: its dimensions inside should be 9 inches deep, and 6 inches wide, formed by bricks on edge, covered with two layers of tiles. The furnace should be fixed low, so that there is an immediate ascent from the end of the furnace into the flue; and a gentle rise—3 inches in 20 feet—should continue to the chimney, which may be of less diameter than the flue with advantage, according to some gardeners; it is not, however, of much importance. In building these *forcing* orchard-houses, the *constant* ventilation through the cracks in the boards must be avoided, or too much heat is lost: the boards must be rebated or be cased with asphalte felt; or, as bricks are cheap, the walls may be of brick, with the ventilating shutters 3 feet long, 1 foot wide, to give length and width of shutters in back and front (see p. 8). A forcing orchard-house may be built with posts of larch cut once down, and covered with ½-inch boards; these, being nailed on, were well tarred with Stockholm tar, and the felt (M'Neil's) then nailed on, and done over twice or thrice with boiling coal-tar, in which lime that had been slaked a fortnight was mixed to the consistency of thick paint: this has formed a shining imperishable mineral coat. I know of nothing equal to it for felt, clay, or lime walls or fences.

I have said that bricks may be used; and to those who build on their own freehold, and like substantial buildings, they are preferable; but although I have many plant-houses built with bricks, I have not employed them in orchard-houses, or even houses for forcing roses, &c. My preference for boards covered with felt for forcing-houses may be owing to imagination; but I may as well state *why* I have preferred and still prefer them. It is because I have found them fiercely hot during the day, even in moderate sunshine (the effects of which are easily modified by abundant ventilation), and agreeably cool during the night, without that stifling atmosphere peculiar to houses with brick walls only, because bricks give out heat for many hours after sunset. Now, in thus rapidly cooling down, they certainly approximate to the descriptions given of the climate of the East, the birthplace of all our choice fruits; and so my peaches, nectarines, grapes, and figs grow and do well in houses with their walls of ½-inch boards and felt.

Commence forcing peaches and apricots in this house about the 1st to the 10th of January. Small streamlets of air will make their way into the house from each side, but as the hot-water pipes are there, these small currents of air are warmed in their passage over them; and the house being by these crevices so well ventilated, there is no occasion to open the shutters till late in March, in hot sunshine, when the fruit is set and swelling fast, and every tree in health. In severe weather in February the fire must be kept up with more care, just to keep the thermometer up from 35° to 40°; so that when forcing is not commenced *very* early, a little more fuel, owing to loss of heat by the crevices in the boards, will remove a world of anxiety about giving air.

Forcing of peaches and nectarines in pots, unless the fruit be required to ripen very early, *i.e.* in April or early in May, is not a difficult operation. The trees should be removed from the orchard-house to the forcing-house in December,[1] and towards the end of the month have a good supply of water, so as to thoroughly moisten the earth; if severe frost comes on, a fire should be lighted at night to keep the earth in the pots from being frozen. About the middle of January forcing may be commenced, the temperature by day kept up to 50° by fire-heat (if the sun shines it will mount up to 60° or 70° for a short time without injury to the trees), the night temperature may go down to 40°. The trees should be syringed twice a day with tepid water—this will soon make the blossom-buds swell: and when they are fully open, which will be in about twelve days, discontinue syringing; and if the weather be mild and sunny, give air very freely in the day, and a little by night, so that no stagnant moist air, so fatal to the blossoms of the peach, may exist in the house. If the weather be keen and frosty, air must still be admitted, and a brisker fire kept up, so that the temperature may not be lower than 50° by day and 36° by night. Close worsted nettings, or Haythorn's hexagon netting, placed over the ventilators inside, will allow of a small quantity of air being given night and day, even in frosty weather, without injury to the blossoms. As soon as the fruit is set and begins to swell, syringing twice a day with tepid water may commence; a day temperature of 60° and a night of 40° to 45° should be kept up; and when sunny, abundance of air may be given, for the thermometer will then rise to 80° and 90°. Instead of lowering the fire, which may lead to inconvenience, admit more air to lower the temperature, for gleams of sunshine in our early spring months are not of long duration, and the temperature is completely at command by the ventilators. To sum up, give brisk fire-heat and abundance of air by day; very little fire-heat, or none if the weather be warm, and a slight portion of air by night; syringe twice a day—in the morning at nine, in the afternoon at four—till the fruit commences to colour, and peaches and nectarines will ripen kindly early in June, and be of fine flavour.

---

[1] If potted in autumn for the purpose of forcing, or shifted into larger pots, the pots should be plunged in a gentle hot-bed in the open air till the end of December.

Apricots, May Duke cherries, and plums may also be forced; and although in large establishments the two former often have houses especially allotted to them, as they require much care to fully succeed, yet a few trees placed near the ventilators—for they require even more air than peaches and nectarines—may do very well with them. It is a good practice to thin out the clusters of blossoms on the May Duke cherries with sharp-pointed scissors before they open, taking out quite half from each cluster.

FORCING WITH ROOT-HEAT.

The most efficient method of forcing grapes in pots, is to give them root-heat, forming a hot-air chamber by enclosing two or three 4-inch hot-water pipes between two 4-inch brick walls, and then placing bars either of iron or wood across from wall to wall: on these should be placed slates; the heat from the hot-water pipes, thus enclosed, will give a surface constantly heated; on this flooring of slates the pots should be placed, not plunged in any material, for if so the air of the house will not be heated sufficiently. So favourable is this root-heat to the growth of trees in pots, that I have found vines in pots placed on the brick-work over a boiler, with a surface heated to 130°, make shoots 20 feet in length, and bear very fine fruit. In a house 12 or 14 feet wide, with two 4-inch pipes going round it, the path should be in the centre, and a bed or hot-air chamber, 5 to 6 feet wide, on each side; the pipes should be near the ground, but not resting on it, and the brickwork may be from 20 to 24 inches in height. This method will answer well for moderate forcing, so as to have grapes ripe in June; but if early forcing is practised there should be two 4-inch hot-water pipes above the hot-air chamber, so as to fill the house with warm air. This extra heat may, however, be dispensed with, if a house is double-glazed, which, as compared with a house single-glazed or heated with the same apparatus, will give an increase of from 10° to 12° of heat: for example, a house heated with two 4-inch pipes round it in cold weather in spring may, with a single roof of glass, have a temperature of 60°, but with a double roof, and with the same heating force, it would have a temperature of 72°.

The late Thomas Bewley, Esq., of Blackrock Park, near Dublin, gave the following description of one of his double-roofed houses:—

'The roof only is double; the inner glass, common 21-oz.; the outer, thick rough plate: the inner is glazed and, as usual, fixed; the outer is all in separate sashes, which rest on the rafters from centre to centre, and hold by a neat screw at bottom; thus any one can be taken off at any time, and the surface of the glass cleaned. The space between the outer and inner glass is from 4 to 5 inches, and in this space is motionless air, which acts as a blanket. The only heating to this house is a pair of 4-inch hot-water pipes running round it, a good deal covered up with rock work.

'If such a house were glazed in the usual way, I do not think I could do more than exclude frost during severe cold; whereas now I can easily maintain 46° in very severe frost, and 48° to 54° in cold weather. The house is for stove-plants, with merely the heating power of a common greenhouse; and, unless the weather be unusually dull and cool, no fire is required from May till October. During the remainder of the year not more than one-half the usual heating power is required

—and this is a house for tropical ferns. I think the annual saving in firing and attendance is fully equal to 20 or 25 per cent.; against this we have the double cost for a roof and increased painting and breakage; but, on the other hand, we should take into account the extraordinary health and vigorous growth of the plants, and consequently their increased value.'

For very early forcing these double-roofed houses will be excellently adapted, and the lean-to form the most economical. Although for a fernery the rough plate-glass for the outer roof may be more eligible, I should prefer for fruit-forcing good 21-oz. glass for both roofs, as a clear light is of so much consequence in winter and early spring.

THE HEDGE ORCHARD-HOUSE.

Some forty years since numerous beech hedges were planted for shelter, standing with their ends S.E. and N.W. A few years ago their S.W. sides looked such compact green walls, 8 feet high, that I was tempted to rear against them four lean-to houses, each 40 feet long and 12 feet wide, 8 feet high at back, and 3 feet high at front, with a sunken path in the centre. The climate in these houses in the summer months is most delightful. Tea-scented roses, magnolias, and other shrubs liable to injury from our severe winters, thrive admirably, owing to the dryness of the soil and air.

Apricots and peaches ripen about three weeks or a month later than those on walls; but, owing to the quantity of cold air admitted through the back hedge in spring, their blossoms often suffer in April, if frosts be severe. This was the case in April 1854 and 1855; and some small span-roofed houses were built, 12 and 14 feet wide, 4 feet high at the sides, and, instead of using boards, to plant hedges to form the walls—one of yew, the other of Siberian arbor-vitæ. These are clipped twice in the growing season; they now form compact hedges, and seem to flourish all the better for the drip from the glass, which pours into them when it rains heavily.

The proper dimensions for one of these span-roofed houses should be—height at sides, 5 feet; height to ridge, 9 feet; width, 14 feet. Yews or arbor-vitæs may be used for hedges, as they seem equally adapted to bear the drip from the roof. The appearance of these verdant walls, when nicely clipped, is quite enjoyable.

I mention these span-roofed hedge-houses, not only because their climate in spring, summer, and autumn is most charming, and perfect as a promenade for persons in delicate health, but for their convenience in retarding fruits. The trees bloom ten or twelve days later than those in the regular orchard-house, and generally escape injury from spring frosts; there is such a constant percolation of air through the hedges when the sun shines, that the healthy growth is surprising. If Royal George and Noblesse peaches are to be retarded, they may be removed from the boarded orchard-house to the span-roofed hedge-house from the first week in June till August; they will ripen about three weeks later than those left in it. Apricots, plums, and pears ripen well in these houses, and are always perfect in flavour; cherries are liable to be eaten by birds which creep through the hedges. The great charm of them is their perfect ventilation without any trouble. For many kinds of greenhouse plants they will be found the best of summer quarters; the increased temperature in sunny weather, from 15° to 20° above the open air, and the absence of heavy storms, which so often injure exotics when placed out of doors in summer, are most advantageous to their well-doing.

THE TROPICAL ORCHARD-HOUSE.

An orchard-house for tropical fruits is not a Utopian idea. The variety of tropical fruits seem almost endless; some of them, if I may judge from description, are too rich, others too insipid, for English palates, and of the greater part the trees that bear them would require a house far beyond the means of the amateur not blessed with a large fortune. A tropical orchard-house for fruit-trees of moderate growth, not extravagant in its dimensions, and yet capable of giving many luxuries, may be recommended.

The small span-roofed house, with some little modification, described in p. 18, seems best adapted for this purpose. Its side should be 4½ to 5 feet in height, 3 feet of which should be 9-inch brickwork, and 2 feet (the upper part) of glass; with sashes 2 feet long, on pivots or hinges, at intervals of 5 feet, for ventilation in hot weather. It should be glazed with double crown-glass, which is very clear, and rarely gives occasion to scorching. Its height should be 15 feet, the path 2½ feet wide, and the borders on each side 4½ feet wide, raised with brickwork to 16 inches in height. In the centre of each border two 4-inch hot-water pipes should be laid, and then a flooring of slates laid across from wall to wall of each bed, so as to leave a space for a hot-air chamber; 6 inches of the brickwork must be carried up above the slates to form the perpetual hot-bed on which the pots are to stand. The compost for this border should be three parts turfy sandy loam, as lumpy as possible, and one part bricks broken into small pieces, from the size of a nut to that of a walnut, with their dust; these should be mixed with the above, to keep it open and favourable for drainage, and a border of mould made with it on the slates, three inches in depth. A perpetual hot-bed is thus formed. So far this is a safe and necessary step; but the hot-bed will not heat the air of the house sufficiently in the damp and chilly days of winter. This must be done by two 4-inch hot-water pipes carried round both sides of the house, next to the walls, just above the surface of the borders. The atmosphere of a house thus heated should range, in spring, summer, and autumn, from 70° to 90° (the latter only in sunny weather); and from 50° to 60° in winter, *i.e.*, from the end of November till the middle of February.

ORANGE-TREE CULTURE.

DESSERT ORANGE CULTURE.

Few of the fruits given to man contribute so largely to satisfy the daily needs of humanity as the orange; entire provinces of the fairest portions of the planet are devoted specially to the production of this inestimable fruit, and worthily. The extraordinary property of keeping both outwardly and inwardly all its excellent qualities is possessed by this fruit alone. The origin of the orange appears to be lost in antiquity, and as no specimen of a wilding in its original *habitat* has been discovered, it seems as if the fruit, like Minerva, had sprung into being perfect at all points. It is alike to be discovered in the mythology of Europe, and in the remote and fabulous antiquity of China, a very fine and fruitful specimen being figured in the 'Willow pattern' plate.

In the time of John Evelyn dessert oranges were evidently grown as a luxury, as he alludes to the fact that he plucked as good fruit from his own trees as he could wish. The 'orangerie' at Versailles achieved a lurid reputation in the earlier days of the trouble and confusion preceding the great 'Revolution;' but the orange-trees of that time grown as ornaments to royal and princely gardens were the bitter variety known as Seville oranges. An orangery, generally dark and dismal, was at one time as much an imperative appendage to a well-kept garden as the forcing house; but it is not easy to understand why it happened that few gardens possessed the dessert varieties, as they require no better climate or treatment than the bitter oranges, and being equally liberal in producing both flowers and fruit.

It is well known that orange-trees, cultivated in the usual way in France or England, never give fruit at all eatable, solely from the lack of heat at their ripening period, late in autumn and winter. In Grenada (West Indies) they commence to ripen towards the end of October, in a temperature varying from 70° to 80° or thereabouts; their flavour there, freshly gathered from the trees, is so delicious that they are far superior to those we receive from St. Michael's and other places, all of which are gathered before they are ripe. In our tropical orchard-house oranges ripen in October, November, and December. How agreeable to be able to gather a portion of the Christmas dessert from one's own trees!

As an ornamental tree in the greenhouse and conservatory, it is an old friend; and perhaps no tree in the known world has suffered, and does suffer, such vicissitudes, yet living and seeming to thrive under them. It *glories* in a tropical climate, and yet *lives* and *grows* after being poked into those cellar-like vaults used for its winter quarters on the Continent; it gives flowers in abundance under such treatment, and would even give its fruit—albeit uneatable—if permitted. Nearly the same kind of cultivation has been followed for very many years in England; it has rarely had heat sufficient to keep the tree in full vigour; and its roots, in pots or tubs, must have suffered severely from having been placed out of doors in summer on our cool damp soil, and in winter on a stone floor still more cold.

In cultivating the orange for its fruit, the first consideration is to procure some of the most desirable varieties, such as the delicious thin and smooth-rinded oranges which we receive from St. Michael's, the Maltese Blood orange, and the Tangierine.

The Tangierine is of all oranges the most desirable, as it is a most abundant bearer, and produces fruit of as fine a flavour in the orchard-house as at Lisbon. It requires, however, different treatment from that of the usual orchard-house trees; for, although comparatively hardy, it must have the shelter of a green-house or conservatory during the year, so as to be protected from summer rains and the winter's frost.

There are two methods of cultivating this most charming fruit, the Tangierine orange. The first and the most eligible is by forcing, so as to have the fruit ripe by October: if properly treated they will then be in the highest perfection, their skins bursting with their delicious juice. To carry out this mode of culture, the trees should be removed to the pinery or vinery, where early grapes are being forced, early in the month of January; the pots plunged in gentle heat in the high temperature of such houses. They will blossom towards the end of February, and should be treated as all other kinds of fruit-trees are when in bloom—*i.e.* the pots and the lower branches may be syringed, but the blossoms kept dry. They will set large crops of fruit, which, if too much crowded, should be thinned. If possible, the pots should be kept plunged, or stand on a heated surface all the summer in the temperature of the pinery or forcing vinery; they will then ripen their fruit early in autumn, when oranges are rare.

The other method is to keep the trees in the greenhouse or conservatory all through the winter, and remove them to the orchard-house in May; they will blossom in May, and set their fruit, which will increase in size slowly all the summer, but not ripen till the following year, in June or July. The trees should be removed from the orchard to the green-house the end of September. This is not so satisfactory a method of growing this very pretty and nice fruit as the former, but the trees in bloom and in fruit in May are most interesting objects in the orchard-house.

The houses best adapted for their cultivation are the large span-roofed, 24 feet wide, 6 feet high at each side, and 15 feet high in the centre. A house of this size will require eight 4-inch hot-water pipes, four on each side, as artificial heat is required all the year to ripen oranges in one season perfectly.

A smaller span-roofed house, 5½ feet high at each side, and 12 feet high in the centre, heated by four 4-inch hot-water pipes, two on each side, is almost as eligible for orange culture as one even of the larger size. A house of these dimensions, with a central path, and a border on each side planted with orange-trees, would form a pleasant and productive orange-garden; but to form an orange-grove, so as to have trees of fine growth, and to give abundant crops, the larger house must be resorted to.

A Tangierine orange-house is a pleasant addition to the fruit-garden; the trees planted in a 14-feet span-roofed house, the borders heated with hot-water pipes, and the air with hot-water pipes above the surface, would be both fruitful and beautiful at all seasons. Their habit is dwarf, and yet graceful, from the smallness of their leaves. They seldom, even in the orange-gardens of Portugal, attain a greater height than from 5 to 7 feet. This delicious little orange is only eaten in perfection when fresh from the tree. In Lisbon it is sent to the dessert in clusters with leaves attached to them; unless these are quite fresh and green when the fruit is served, it is not reckoned in full flavour. If grown in the tropical orchard-house, the trees should be placed in the coolest part of it, and have abundance of air in mild weather in winter: they will then bloom later, and set their fruit with greater certainty.

The best form of tree for an orange-garden under glass is the round-headed, a form which it seems to take naturally; for if it is endeavoured to be cultivated as a pyramid, its lower branches soon become weakly and unhealthy. If trees with stems 2 or 3 feet in height are planted, the lower branches may be gradually removed till a clear stem of 5 feet in height is formed, and this height will be found sufficient. They may be planted from 5 to 6 or 7 feet apart, according to the size of the house, and the room which can be afforded for each tree. It must not be forgotten that in small houses the heads of the trees may be kept in a compact state by summer pinching, and in large houses be allowed a greater freedom of growth, so that the owner of an orange-garden in England may sit under the shade of his orange-trees.

The St. Michael's orange is well known for its thin rind and excellent flavour. A very superior sort, which I received direct from St. Michael's, seems to be a most prolific variety, for trees only 1 foot in height are full of blossoms and fruit. The treatment recommended for the culture of the Tangierine orange may be followed in cultivating this sort. Tangierine and St. Michael's orange-trees, planted in the borders of a large span-roofed house, furnished with enough of a heating apparatus to keep out frost, and the borders heated as before mentioned, will grow well and bear well; so that it is quite probable our markets will be supplied in the autumn with Tangierine oranges freshly gathered from the trees, and full of the delicious aroma they are renowned for.

There are several kinds of oranges cultivated in the Azores besides that thin-rinded excellent sort known *par excellence* as the St. Michael's. The following kinds I have recently received, and give their descriptions:—The Egg orange, oval, very handsome and delicious; the Plata, or Silver orange, very delicious; the Long orange, a remarkable sort, very fine and rich; some specimens of this, sent to the Royal Horticultural Society, received a special certificate. The White Orange, with striped fruit and white flesh, is a very pretty sort. Sustain, Dulcissima, Exquisite, are varieties evidently from seed of the ordinary St. Michael's, differing slightly in foliage and form of fruit. There are two varieties of the Maltese, the Blood and the Oval, which is bloodless: the latter is a well-flavoured and large fruit, but is not better than the St. Michael's. The former should be grown in every orange-house; it is very compact in growth, produces an abundant crop of flowers, and is delicious in flavour, although slightly repulsive in appearance when cut. When first introduced in the orange-house, some years since, these oranges did not bear fruit so freely as the varieties from the Azores; but possibly the plants have become accustomed to the climate, and they are now quite as fertile as the other varieties; the Persian lime, perfume most agreeable, with a fine aroma, and sweet and juicy; the Sweet lemon, rind thick, flavour sweet and agreeable.

My trees thrive vigorously and ripen their fruit in a house which is heated gently, and kept moist by syringing twice a day.

There are also some sweet oranges cultivated in France, of which trees could be readily introduced; but the first-named varieties seem to me most worthy of the careful cultivation to be given them in the tropical orchard-house.

The soil for potting should consist of the following: three parts sandy loam, from the surface of some pasture or healthy common, chopped up with its turf, and used with its lumps of turf about the size of large walnuts, and its fine mould the result of chopping, all mixed together; and one part rotten manure at least a year old. To a bushel of this compost add a quarter of a peck of silver-sand or any coarse siliceous sand (calcareous sand and road-sand are injurious); and the mixture will do for all the fruit-trees of the tropical orchard-house, as well as for oranges. Ferruginous soils evidently suit the orange better than those of a calcareous nature, and should be selected. The soil of some parts of Sussex is well adapted, and if the climate would permit this county would be our large orange-grove. In some of the orange plantations of Italy the soil is annually manured with old rags; and as Italian beggars are frugal with regard to their habiliments, the rags must contain much animal oil; I think, therefore that cotton oil-cake, sold by agricultural manure merchants, will prove an excellent addition to the potting material: add also a few lumps of charcoal. In potting the orange, it is better to commence with a pot too small rather than too large, for, unlike the peach or the plum, it does not feed rapidly, and at once fill the pot with roots. Thus a tree two or three years old may be potted in a 9-inch pot, suffered to remain for two years, and then removed to a 13-inch pot, in which it may remain (unless the house be very large, and a large tree be wished for) six, seven, or ten years. A portion of the surface-soil should be annually removed in December, but not deeper than from 1 to 2 inches, and the pots filled up with the above compost; and about the beginning of March a surface-dressing of the compost described at p. 62 should be given. The French cultivators strew fresh sheep's manure on the surface; they also place their trees in a pure peat earth. Two other surface-dressings of the compost should be given—one in June, the other in the beginning of September. The trees will, of course, be placed on the hot-bed, or plunged slightly 2 or 3 inches into the mould. I am not, however, an advocate for plunging to any extent, unless very rapid growth be required: for I find that trees in pots, standing *on* a bed of heated mould and rooting into it, make a healthier although a slower growth.

As soon as the fruit is gathered, which ought to be by the end of February,[1] when foreign oranges commence to be good, the trees should be lifted and any roots that have made their way through the bottom of the pots should be cut off and surface-dressing given.

Orange-trees cultivated in the tropical orchard-house should have a part of the house to themselves, divided by a light glass partition, as they require and will bear more ventilation than other tropical fruit-bearing trees. Thus both borders of the small span-roofed house should be appropriated to them, the other part of the house being occupied with mixed trees and shrubs. Air can then be given to them by opening the sashes on one or both sides, without interfering with trees and shrubs requiring less ventilation.

Orange-trees, when grown constantly under glass, are liable to a black fungus on the upper surface of the leaves; this can only be removed with a sponge and warm water. They should be syringed with soft tepid water twice a day (at 9 A.M. and 5 P.M.) during the summer, and once a day in the morning, in sunny weather, in early spring and autumn; while the fruit is ripening in the winter, syringing should be discontinued. It is the custom to cultivate orange-trees in square boxes made of oak. I am inclined, however, to recommend pots perforated at bottom, as usual with other pots. Slate pots are very neat and even ornamental; with three perforations they would doubtless answer very well. If wooden boxes be used, they should have bars at the bottom, to allow the roots to make their way into the hot-bed, and for drainage.

---

[1] I have departed from this rule by allowing fruits of the Maltese and St. Michael's to remain on the trees till June this present year (1865); they were then perfectly delicious.

HOW TO FORM AN ORANGE GROVE.

There appears something bordering on romance when one talks of an orange grove in England, and thinks of those unfruitful trees in tubs, so common and so ugly; yet it is quite feasible. One day, ere long, orange groves under glass, giving fruit and flowers and a perfumed promenade more agreeable than the dusty surface of the ground under a plantation of orange-trees in the countries where they are cultivated for their fruit, will be common enough in England, when the method of making one is pointed out. There are two modes of forming a plantation of orange-trees under glass; one is simply to keep the temperature in winter from sinking below 30°; this may be done by having, in a large span-roofed house 24 feet wide, five 4-inch hot-water pipes all round the house. In a house of this size, and thus heated, a central path, 4 feet wide or more, should be formed, and the border on each side planted with Tangierine, St. Michael's, and any other kind of orange that is not too robust and vigorous in its habit. Citrons, lemons, and shaddocks should not be mixed with oranges in planting, but have a portion of the house devoted to them, or they will soon shade the more humble-growing kinds. Tangierine, St.

Michael's, or other kinds of oranges of moderate growth, may be planted about 5 feet apart, and the borders in which they are planted, if not loamy or clayey, but light and sandy (for the orange likes a stiff soil when growing *au naturel*), should have a dressing of stiff yellowish loam and rotten manure—two-thirds of the former to one of the latter, and 6 inches thick; this should be forked over and mixed with the soil to 18 inches in depth, and you will then have a border in which orange-trees will grow freely and bear abundantly.

A large span-roofed house, 100 feet long and 24 feet wide, would form a grove large enough for a most enjoyable promenade. There is another mode of forming an orange grove under glass, more expensive and luxurious, by adopting 'geothermal culture,' and heating the borders as well as the air of the house. A house 24 feet wide, under this system, would require four 4-inch hot-water pipes under each border (with rubble 4 inches deep over them), placed about 2 feet under the surface; with a path in the centre of the house 5 feet wide; each border may be from 9 to 10 feet wide; the pipes about 2 feet apart; besides these, there must be four 4-inch hot-water pipes to heat the air of the house in the ripening season. In a house thus heated, those delicious (when first gathered) Maltese Blood oranges may be grown, and the Pernambuco and other tropical varieties of the genus *Citrus*. Tangierine and St. Michael's orange-trees planted in these warm borders would ripen their fruit very early, and it would be sugary and rich.

I need scarcely add that an orange grove may be formed in a small span-roofed house 14 feet wide, with a path in the centre; and since writing the above directions for heating the borders, I have come to the conclusion that if the borders are raised 18 inches above the surface of the floor, either in the small or large houses, the heated air of the house will penetrate the soil so as to keep the trees in health and ripen their fruit.

There seems, indeed, no end to what can be done by Englishmen with the aid of artificial heat and glass. What a beautiful vineyard under glass could be formed by such heated borders as I have described above! and how charming 'to make a promenade,' as our neighbours say, in such a place! No one but an amateur of gardening can imagine the pure, quiet pleasure of taking a morning walk in the orange-house, full of aromatic flowers and fruit, during the dreary months of December and till the end of March, and plucking from the trees oranges fully ripe. I have had much experience in the culture, and I may add in the eating, of fruit, and I can say with a firm conviction that I have never enjoyed any kinds of fruit so much as I have oranges of my own plucking in winter. The beauty and interest attached to an orange-house, when the trees are kept in fine health, I can testify to in all sincerity. My house is an unfailing source of pleasure. A large house—a real orange grove—would be a realisation of the gardens of the Hesperides. The trees ever green, almost ever blooming, seem to be an ever-giving source of delight to a mind alive to the beauties of Nature!

The insects which infest orange-trees are two varieties of scale, and also the green aphis; the former are easily destroyed by methylated spirits of wine, applied with a painter's brush, and the latter by quassia water—4 ounces of quassia chips boiled ten minutes in a gallon of water. This is also an excellent preventive to scale, if the trees are syringed with it once a week; it should be allowed to settle and be perfectly clear. If the leaves become black or dirty, they should be sponged with warm water.

Painting the stems with paraffin is certain destruction to scale, but care must be taken that it is applied only to the hard wood; the oil will injure young and tender shoots.

With regard to pruning fruit-bearing orange-trees, very little is required. The shoots that are vigorous, and diverge from the round heads of the tree, should be shortened in summer by pinching them to half their length; and in winter, if the heads of the trees are too much crowded with small shoots, they should be thinned with a sharp knife.

TROPICAL FRUITS.

The Mangosteen (*Garcinia mangostana*).—There are, it is said, many kinds of this 'most delicious of all fruits,' varying in size, flavour, and fertility. Penang and Singapore are, according to report, the only places in which it is brought to perfection; the communication with these places is now much quickened by the overland route and steamers. Young trees of some of the most prolific varieties should be imported, and also abundance of young trees of some of the more common kinds, to be used as stocks for grafting, which, as is well known, often induces a tree to bear fruit. By these means fruit-bearing mangosteen-trees will soon cease to be rarities, and we may even live to see Covent Garden supplied with this rare fruit home-grown. The trees should be planted in the pots usually employed for orchard-house trees, and suffered to root into the hot-bed of mould on which they are placed; if they are inclined to grow too vigorously, they should be kept in check by lifting the pots; and when the fruit is gathered, root-pruning and top-dressing in the usual way should be attended to. In short, to prevent repetition, the treatment recommended for orange-trees will, as far as I can see, answer for all other tropical orchard-house trees.

The Chirimoya (*Anona cherimolia*).—In our estimation, this is the mangosteen of South America. A recent traveller in Peru (Markham) describes it as resembling 'spiritualised strawberries and cream.' It is said to attain its greatest perfection at Caraccas, owing probably to peculiarity of climate, as is the case with the mangosteen at Singapore and Penang. If there be any superior varieties in existence they should be sought for at Caraccas: and when tropical orchard-houses are established, a consignment of Wardian cases filled with young trees from La Guayra (which is only about 20 miles from Caraccas, thus giving but trifling land-carriage), will, I have no doubt, be a safe venture.

The Pomegranate (*Punica granatum*).—Although this tree does not in general bloom and bear fruit under glass, treated as it is in France and England, I am inclined to think that, like orange-trees, it will succeed in the tropical orchard-house. There is a large-fruited sort from Malta, and a seedless variety, both of them worthy of a trial.

The Lee-Chee (*Euphoria litchi*).—This, even when brought over from China in a half-dried state, is, as I can testify, a delicious fruit; when fresh from the tree, it is said by those who have visited China to be most refreshing and excellent.

The Loquat (*Eriobotrya japonica*).—This is also a Chinese fruit, which will ripen in the tropical orchard-house in winter, and is therefore desirable: trees grafted on the common whitethorn or the quince stock will come into bearing more quickly than those reared from cuttings, layers, or seeds. The late Lord Bagot, according to Loudon, used to grow this fruit in great perfection at Blithefield: its flavour is mild and agreeable, something like a medlar. The tree is hardy enough to live in a cool orchard-house.

The Guava (*Psidium Cattleyanum*).—This is the most prolific of the guavas, and bears most abundantly; its flavour is peculiar, and does not at first please all palates, but it is quite worthy of cultivation. There are also the Spice Guava, the size and shape of a lemon, with a white interior and a clove-like flavour; and the Large Yellow Guava, its inside red; both of them esteemed in Grenada, an island remarkable for the great variety of its tropical fruits.

The Granadilla (*Passiflora*).—There are many varieties of this fruit, varying in flavour, size, and colour, so that it is difficult to point out the best for our purpose. To some persons their flavour is most agreeable, to others the contrary. I suspect this must be partly owing to the variation of flavour in different sorts. Markham speaks of the Peruvian Granadilla as being delicious. The 'Water Lemon,' a variety of the Granadilla, is the size of a hen's egg, and full of a most refreshing juice; it is a delicious fruit. They are all climbers, and should have a frame of iron wire placed in the pot to train them to.

The Mango (*Mangifera indica*).—There are numerous varieties of this fruit in India, more particularly in Java: some of the most free-bearing varieties should be imported, as it is likely to prove a valuable fruit-tree for this species of culture. The late T. A.

Knight cultivated mangoes, with great success, at Downton Castle. They were thought superior to the best Eastern mangoes, being free from turpentine flavour.

The Dwarf Plantain (*Musa Cavendishii.*)—This fine and most prolific fruit-bearing plant will not group well with our other tropical trees and bushes, but a place should be found for it at the warm end of the house near the boiler. As it is a gross feeder, it must have a larger pot than ordinary: one from 16 to 18 inches in depth, and the same in diameter, will not be too large: such a pot will require at least seven apertures at bottom for the emission of roots. This plantain, however, roots so strongly, that care must be taken to lift the pot at least once a fortnight, and rather to give it fortnightly surface-dressings of manure than suffer its roots to spread too far—in short, to feed it from above rather than from below.

The Rose Apple (*Jambosa vulgaris*).—According to Loudon, in his 'Encyclopædia of Gardening,' this is an agreeable tropical fruit, 'about the size of a hen's egg, rose-coloured and white-fleshed, with the flavour of a ripe apricot,' ripening in December.

The sweet Lime is a variety of the genus *Citrus*, the size and shape of a full-sized nectarine, with a thin and fragrant rind of a pale yellow; its flavour is like that of a very superior orange, with a delicious aroma, and so wholesome and refreshing is it that 'from twelve to eighteen may be eaten at once with pleasure and without injury to health.' The tree is very prolific, and bears its beautiful fruit in clusters of ten and fifteen each: this is a fruit highly esteemed in Grenada.

The Sapodilla (*a variety of Achras Sapota*) is also a Grenadian fruit; it is the size and shape of a large lemon with a brown rough coat, and a luscious juicy pulp, in which a few black seeds are imbedded; it is commonly eaten with a spoon, and is in great estimation.

The Mangaba (*Hancornia speciosa*), a Brazilian fruit growing plentifully near Pernambuco, a small tree with drooping branches resembling the weeping birch, must be introduced, as it will undoubtedly do well in a tropical orchard-house.

The Marangaba (*Psidium pygmœum of Arrudo*), a shrub from 1 to 2 feet high, the fruit about the size of a large gooseberry, with a delicious flavour resembling that of the strawberry, is also a desirable Brazilian fruit.

The Nabuzeiro (*Spondias tuberosa*), a fruit about twice the size of a large gooseberry, of a yellowish colour; when ripe it has juicy pulp under its coriaceous skin, of a pleasant sweetish-acid taste. Like the mangabas, it is only fit to eat when it is so ripe as to fall to the ground.

A variety of the Mangaba (*Hancornia pubescens*), growing near Natividado, has fruit nearly twice the size of that growing so abundantly near Pernambuco, and is even more delicious.

The Jabuticaba (*Eugenia cauliflora*) grows wild in the woods in the south of Brazil, and is also cultivated. It is of a black colour, and about the size of a greengage plum, of a pulpy consistence, and very refreshing.

The late Dr. Gardner, in his 'Travels in Brazil,' mentions all these fruits with the descriptions I have given.

Kidder also found a fruit near San Paulo, called *Jaboticabeira*, perhaps the *Jabuticaba*—a fruit like a large purple grape, growing from the trunk and branches of the tree, and highly delicious.

The Fig.—This may be made a most desirable tropical orchard-house tree, and so managed as to give its quota to the Christmas dessert. Trees of one or two years old, that have been protected from the winter in a cold pit, should be potted early in May into 13-inch pots, and protected from our usual May frosts by being placed in the orchard-house or any cold frame or pit, till the first week in June. They may then be placed out of doors for the summer in a sunny exposure, sheltered from boisterous winds. Liquid manure may be given to them once a week, and they should be lifted once a fortnight, to prevent the roots, which would make their way through the bottom of the pot, from becoming too large. They may remain in their summer quarters till the end of September; but if one or two of our early autumnal frosts occur in that month, they should be protected by having a piece of calico or a little hay thrown over them. At the end of the month they will be covered with young green figs, and if removed to the tropical orchard-house they will ripen their fruit towards the end of November and through December. If it be wished to retard the ripening of the fruit on some of the trees, they may be placed in the common orchard-house or a cold pit till the first week in November. They will then, on being removed to the tropical orchard-house, mature their fruit even as late as January. The most prolific and best varieties for winter figs are the White Ischia (this is sometimes called, incorrectly, the Nerii, and is a most abundant bearer); the Brown Turkey, or, as it is often called, Lee's Perpetual; and the White Marseilles.

I have in these few pages given the outline of what may be done towards increasing our garden luxuries. The culture of tropical fruits is not a new idea; but I have endeavoured to give a new version of an old idea. There is now no occasion for the bark-bed, in which it was once thought necessary to plunge the pots containing the plants of all tropical fruits. A perpetual hot-bed on which to place the trees—which may or may not be a new invention—is now easily formed by hot-water pipes; and I well know, and again say, that a tree standing *on* a hot-bed will make a healthier although slower growth than one that is plunged *into* a bark-bed. Moreover, the latter is always disagreeable from its requiring to be turned and renewed, as well as from its unpleasant smell.

It will be seen that the description of a comparatively small tropical orchard-house is given; this I have done that I might be consistent. Large gardens are managed by good gardeners, who know how to build houses, if the means be provided, much better than I can tell them; but when the system of culture is understood, I can see no reason why large span-roofed houses should not be built, even in gardens of moderate size. The great object is to have abundance of heat at command; the central border, therefore, in a large span-roofed house, would require four 4-inch hot-water pipes, each side border two; and to heat the air would require four 4-inch hot-water pipes round the sides. In such a house the trees might be suffered to grow to a goodly size, and would give a great abundance of tropical fruits, from the delicious little Lee-Chee to the exquisite freshly gathered Maltese orange.

The enumeration and description of only a few tropical fruits is given: when their culture is better understood the list may be extended; for in all tropical climates there are numerous fruit-bearing trees and bushes utterly unknown to English gardens. It may perhaps be said that some of the kinds of fruit recommended will form trees too large for a house of the dimensions given: this ought not to influence the cultivator, for, as is well known, the fig grows into a very large tree when the soil and climate are favourable, and yet bears well in a pot of moderate size. Collectors have, for many years past, paid much more attention to orchids and pines than to tropical fruits, only because the culture of these has not been carried on in England with spirit. Let us hope that, owing to the introduction of hot water as a means of heating, the low price of glass, bricks, and timber, we shall see tropical orchard-houses rising up, and rivalling the now numerous orchard-houses in their agreeable productions.

INSECTS,

AND HOW TO DESTROY THEM.

Numerous species of aphides, under the name of 'blight,' are most troublesome enemies to all fruit-trees in the open air, and trees in the orchard-house are in no way exempt from their visitations; they have the effect, however, of causing the cultivator to be 'wide awake' and watchful. The brown aphis, which specially afflicts the peach and nectarine, is very tough and tenacious when suffered to gain a footing; in fact, it will effectually destroy not only the hopes of fruit, but the life of the tree, if not prevented by timely care. Fortunately the remedy is easily applied. The following mixture is fatal to all kinds of aphis:—Boil four ounces of quassia-chips in a gallon of soft water until the bitter principle has been extracted; generally the time required is from twenty to thirty minutes. In this mixture dissolve at the time of application four ounces of soft-soap to the gallon, and use while hot at about a temperature of 80°, or as hot as the hand can bear—I mean the skin of an ordinary working hand; a sailor's hand, when off a long voyage, would probably endure several degrees higher than is either necessary or good for the health of the leaves, although water at a temperature of 150° is not injurious.

For a smaller quantity of the dressing apply one ounce of quassia-chips to one quart of water; boil for ten minutes, and apply soft-soap in the same proportion, viz. one ounce, at the time of application. I have found from recent experience that it is better to use this mixture of quassia and soft-soap when hot; but it has been applied cold for years with the most baneful result to the aphides. It may therefore be used either hot or cold; but the former is to be preferred as the more humane, the insects evidently dying a quicker death.

Apply with a painter's brush, by placing the left hand against the shoot, holding in the palm of the hand a piece of glass or slate; then brush the shoots upwards with a full brush. If one application does not kill, repeat until the desired effect is produced. This mixture has destroyed, and does destroy the blue aphis of the plum and the black aphis of the cherry, both these varieties being hard to be killed, and apparently clad in aphidian mail.

A very efficient mode of destruction in small houses, or those of moderate dimensions, is by fumigation, when a large number of trees are infested, or when the aphides make their appearance on the young shoots just before or while the trees are in bloom, making the application of quassia-water hazardous. This is best done in the evening, and most economically with tobacco-rag. The house should be shut up, and two or three (or more, according to the size of the house) 8-inch flower-pots, with large burning wood-embers at the bottom, placed on a tripod, or on two or three stones, so that there be a draught through the bottom, and then filled with the rag. The next morning the trees (if the fruit be set, otherwise not) should be syringed with all the force possible, by applying the syringe close to each. Another mode of fumigation (and this is convenient when only a tree or two are infested) is to envelop the tree in tiffany or thin calico, and then place under the covering a small pot of ignited tobacco-paper. In all cases the dead and dying insects should be washed off with the syringe.

In the orchard-house culture of peaches and nectarines, syringing must play an important part; for the Red Spider is so fond of their leaves, that, like Sindbad's Old Man of the Sea, he will stick closely, and cannot be dislodged without applying the syringe close to the under-surface of them. If this pest be suffered to make the least progress, the flavour of the fruit will be entirely destroyed. A small pocket lens, in the hands of the amateur, will be the best instrument to discern it: looking closely at the under-surface of the leaves, if it be there, a small bright-red speck, like a red grain of sand, will be seen. The experienced gardener does not look for them. One glance at the upper surface of those leaves which show some minute yellowish specks is quite enough for him. If, therefore, the least sign be apparent, continue the regular syringing, even till the fruit be ripe; otherwise syringing may be discontinued when the peaches and nectarines commence to soften, preparatory to ripening.

A very excellent mode of using sulphur was given in the 'Gardener's Chronicle' (No. 1, 1858, p. 5), by Mr. Gardener, of Rossall Hall, Fleetwood:—'The house being shut up quite close in the evening, some large flower-pots (say 13-inch pots) were half filled with fresh unslaked lime: this was moistened with about six quarts of water, and one ounce of flowers of sulphur strewed over it, and suffered to remain all night.[1] The next morning the house was syringed most abundantly.' This will destroy the red spider and also the mildew on vines.

The operations of ants must be carefully watched; these industrious and at the same time mischievous insects will stock a house apparently free of plant lice; they will carry the ova from tree to tree, and, as the aphides when full grown, afford their keepers—the ants—abundant provender, the preserves are well sustained.

---

[1] In the fifth edition, the word 'sprinkled' was used instead of 'moistened'; and too large a 'handful' of sulphur has been in some instances applied, from which some mischief has occurred. One ounce of flowers of sulphur is the proper quantity. One 13-inch pot, which holds nearly a peck of lime, will suffice for a house 20 × 14 feet.

Although it appears heartless, the ant must be destroyed. Carbolic acid poured into their nests will most effectually do this, and the noisome and powerful smell of the acid prevents their return. The stems of the trees on which they are observed must be encircled with a band of chalk, renewed as often as it becomes effaced. I am sorry to enter an indictment and sentence against these interesting insects, but as they are thoroughly domesticated, they must be taught, like those to whom they are often cited as an example, to keep in their places. They are most mischievous when the trees are in flower. For some reason, which I have not been able to discover, they have a habit of biting off the anthers close to the base; they do not touch the pistil, thus sparing the main source of reproduction.

Scale, which appears to attack the orange-tree specially, should be washed off the trees with paraffine used in hot water.

Sulphur, thrown into water heated to 150°, is an excellent remedy for mildew on peaches and also on vines; the hot water will not injure the leaves.

MONTHLY CALENDAR.

JANUARY.

House closed day and night. The pots, if not already protected, should be covered with dry hay or litter. Examine the soil in pots, and give water if very dry. This must not be given in frosty weather, and sparingly when it is given. Paint or wash the trees with quassia water, if any insect can be seen, and syringe after application. In bright sunny weather open the ventilators to lower the temperature. Clean and wash the rafters, and paint, if the weather is dry enough. Too much care cannot be taken in keeping the house perfectly clean; limewash all the brickwork, and treat all corners and woodwork likely to harbour insects with a strong solution of carbolic acid.

FEBRUARY.

Continue the same rule for ventilation and protection. Towards the end of the month remove the trees to their summer stations, unless the weather is very severe. During this month the house ought to be gay with bulbs grown in pots.

MARCH.

Early in the month all the trees should be pruned. Watering must be begun—unless the frost be very severe—giving two quarts to each tree, in a 15 or 18-inch pot, and gradually saturating the earth.

If the weather be sunny, with frosty nights, open the house by day, from 9 A.M. to 4 P.M., and close at night. In some seasons the trees will be in flower during this month. If the frost is very severe, a charcoal fire, or better still, one of the petroleum lamp stoves, now made for heating greenhouses, must be placed in the house. It is sufficient to keep the thermometer from going below freezing-point. Apricots flower early, and if not enough to require heat, throw a piece of tiffany over the trees, or old muslin.

Dig and ridge up soil for use in autumn; add manure, to be mixed up in the ridge.

APRIL.

Observe the same regulations as in March as to ventilation. In the beginning of the month the trees will in most seasons be in full bloom. In sites near the sea, or in valleys where the air is damp, it will much facilitate the setting of the fruit if a camel's-hair pencil be passed lightly over the anthers and stigmas when the trees are in full bloom, so as to disperse the pollen which sometimes becomes glued to the anthers, and does not lodge on the stigmas as it should do. When this is the case, the blossoms drop off without setting their fruit. I give my trees a sharp shake while they are in bloom. An ingenious brush for distributing pollen has been constructed in Belgium; it is made of the flower stalks of the *Stipa pennata* tied in a bunch. It is convenient to use on a large scale, as the grass, when charged with pollen, can be dusted over many flowers. If severe frosts come on, which is sometimes the case, and the thermometer in the open air descends to 28° in the evening, a fire, consisting of six or eight quarts of charcoal, should be placed in an iron pan in the centre of the house: for a house 30 feet long and

14 feet wide, one pan will do; for one 100 feet long, three pans will be required: or use a petroleum lamp. Whenever charcoal is burnt, the ventilators over the door or doors in span-roofed houses should be left open. Watering the trees thoroughly while they are in bloom is of great consequence: the fruit often drops off if the earth, which has been drying ever since November, is not soaked through and through.

Towards the end of the month, when the fruit is set and commences to swell, syringe the trees morning and evening with soft water, or spring water that has been exposed to the air for a few hours. Place the syringe close to the under-surface of the leaves. If the weather be dry and warm, the trees may be watered in the evening. The aphides will now begin to make their appearance. Their destruction must be seen to, and it must be thorough.

MAY.

The surface dressing of apricot-trees should be now attended to.

Observe the same regulations as to watering and syringing the leaves as in April. Ventilation must now be strictly attended to: in warm and sunny weather the ventilators must be open by day from 8 A.M. to 6 P.M.; in windy and cold weather keep the house warm, and open the ventilators on the weather side only for a few hours. If the situation of the house be exposed, so that the N.E. wind can blow through it, it will be as well not to open the ventilators that will admit that or the E. wind, when it blows fiercely. The trees have now set their fruit, and require warmth to assist the operation of stoning. Worsted netting, with meshes just large enough to admit the point of the finger, is a most excellent material to place over the ventilating openings inside, to remain all the summer. It softens the violence of a brisk gale, and yet admits plenty of air. It will be found most useful near large smoky towns, for the fibres of the worsted meet in the meshes and keep out sooty particles: insects also never attempt to enter. Aphides will now be very active, and must be destroyed. Apricots will also be infested with a caterpillar in their young shoots: the ends of them must be pinched, so as to crush it. If trees, either bushes or pyramids, are to be under summer pinching[1] only, it may be commenced early in the month, as soon as the young shoots have made five or six leaves. Fig. 23 is a shoot in a fit state for pinching, to be pinched at the fifth leaf. Old trees must be again pruned, all naked shoots removed, prune always to a leaf shoot, keep a symmetrical form.

Syringing at 7 A.M. and 6 P.M. must now be strictly attended to, except with cherries and apricots, which will require it but once a week; and if the weather be hot and dry, the trees will require watering abundantly every evening. Trees in 13-inch pots take one gallon each.

---

[1] Although the word 'pinching' is used, a penknife, to cut off the ends of the young shoots, is usually necessary.

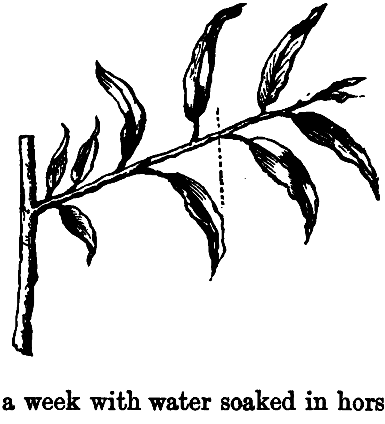
The trees in May will look shabby after blooming. This cannot be helped; the tree has exhausted much of its energy by producing the bloom, and consequently there is a period of arrest. Examine all shoots. Prune leafless branches down to a leaf-shoot. Stop all irregular growth. Surface-dress the pots to assist the tree. Pick off all the small yellow stipules. Destroy the aphides and ants.

JUNE.

Destroy all aphides of whatever colour. Destroy all red spiders.

Syringe morning and evening, and keep the pots well supplied with water. If horses are kept, water the trees once a week with water soaked in horse-droppings for a night. The droppings should be fresh, and the water used in the morning. Pinch the shoots; remove

FIG. 23.



all those that are growing too vigorously. Keep all the growth on the tree well balanced. Cherries will be ripe. Turn out all trees intended for ripening in the open air in summer and autumn. Remember that this month will decide success or failure. At the middle and end of the month thin the fruit hardily.

My rule for thinning the fruit is simple. I leave all those nearest a leaf-bud. Select the most vigorous. Count the number your tree can sustain according to your judgment. Thin gradually to the number; do not do this hastily. You can thin all this month and part of next.

All the ventilators should be open from 8 A.M. till 6 P.M. Add fresh surface-dressing of the usual compost.

The red spider now requires particular attention, and the pocket lens must be brought into use: if syringing fails completely to extirpate it, lime and sulphur, as in p. 209) must be resorted to; also wash the leaves with quassia-water. Remove plum and pear-trees to the open air, to ripen their fruit, if there be a scarcity of room in the house; also apricot-trees.

On the 10th, and again on the 25th, lift the pots to break off the roots, if not plunged in the earth, and prevent them going too deeply into the border. Summer pinching of pyramids and bushes to be attended to.

In this month chlorosis, or 'the yellows,' may affect fruit trees in pots. This is sometimes caused by stagnated water, and sometimes by the stock the tree is grafted on. In such cases the tree should be placed on bricks to assist the drainage, and watered twice a week, for a fortnight or more, with an infusion of sulphate of iron—one oz. to a pint of water, which should then be mixed with five gallons, and two quarts given to a tree at each watering.

JULY.

Turn every plant out of the house not intended for ripening fruit in it. Allow no decorative plants of any kind; all must be given up to fruit. Continue constant watching against aphides. Keep the house netted to prevent birds entering.

Thorough ventilation must be attended to: it is a good practice to open the house before 8 A.M., and close it at 4 P.M., if early ripening of the fruit is desired: syringing and watering as in June. Place some fresh compost loosely on the surface of the soil in the pots. Frequent surface-dressings in summer are better than manure-water. Recollect that Burnett's Disinfecting Fluid, powdered charcoal, and ground coffee are deodorisers. On the 10th and 25th lift the pots, as directed for June. The compressed earth in the pots gives vigour beyond belief.

Early in the month remove, if not already removed, pear-trees to the open air to ripen their fruit (if it be intended to ripen them in the house *abundant* ventilation is necessary); plunge the pots, or the fruit will lose its flavour; also peach and nectarine-trees for retarding (see p. 94).

Summer pinching to be rigidly attended to. This month the house may be open night and day in sultry weather.

AUGUST.

Ventilation and watering the same as in July; syringing till the fruit begins to colour, or, if the house can be kept perfectly free from the red spider by lime and sulphur, discontinue it from the last week of July. Still pinch in laterals, and at the end pinch off the points of all the leading shoots, except figs—these will not require any further pinching.

Remove peaches, nectarines, and apricots to the hedge orchard-house, or to the open air, to retard their ripening, if required.

Summer pinching of peaches as pyramids still to be attended to. The orchard-house, must now have abundance of air, night and day.

SEPTEMBER.

Repot all trees that require shifting into larger pots as soon as the fruit is gathered.

Dig and prepare soil for use in the succeeding year; the longer it is in a ridge the better.

Ventilation as in August, unless the weather be peculiarly windy and stormy. In such weather the house may be closed; watering must be continued, but no syringing.

When peaches and nectarines are ripening, some care is required in watering: the earth must not be saturated, but only enough given to keep the foliage from flagging or drooping.

Late peaches or nectarines should be placed in a part of the house separate from the early varieties; they require syringing a fortnight, or even longer, after the early kinds.

OCTOBER.

Ventilation and watering as in September. About the middle of the month, every tree—except late peaches with their fruit still on them—should be lifted, and all roots cut off close to the bottom of the pot; and about the 24th top-dressing must be done (this is described in p. 62), and a gallon of water given to each tree. If surface-dressing only is to be practised on peach and nectarine trees, this is the proper time to scrape off the surface roots as directed (p. 88). The pots may now be placed close together, so as to give room for other plants, particularly chrysanthemums, which bloom well in the orchard-house all the autumn. Prune vines in pots. On no account remove peach, nectarine, and apricot trees to the open air in autumn, to 'harden their shoots,' as some gardeners say—as if a moist cool climate would ripen the shoots better than the warm dry air of the house. They should remain in the orchard-house, all the year, except, of course, such trees as are placed out of doors to retard their fruit. These should be returned to the house, if possible, before the heavy autumnal rains come on, which saturate the roots, and do infinite mischief to the trees. Plant hyacinths and other spring-flowering bulbs in groups, marking the sites so that the pots are not placed over them in spring; also in large pots. Go over all, and prune all shoots that have apparently ripened thoroughly. This must be merely a preliminary pruning; it will have the effect of strengthening the fruit-bearing buds.

NOVEMBER.

Ventilation the same as in October. On the 5th give each tree a gallon of water, the last for the year, as the soil seldom or never becomes dry in winter. The autumnal top-dressing and watering encourage the emission of young roots; so that the tree is prepared for its fruit-bearing work early in spring. If the brown aphis makes its appearance on the young shoots and buds, use quassia-water and soft-soap, with hot water. Syringe after with cold pure water.

DECEMBER.

The house may now be shut up day and night. Some dry hay or litter should be placed among and on the pots to six inches above the surface: this will keep the roots from injury by frost, and keep the earth in the pots moist.

Paint or syringe the trees with quassia-water (see p. 207). This will destroy the brown aphis, which so often infests the shoots of peach-trees in winter. Two hours afterwards syringe the trees thoroughly with pure water.

If a heavy fall of snow takes place, it should be removed from the roof, or it may break through the glass.

CALENDAR FOR FORCING HOUSE FOR TREES IN POTS.

(Persecute and destroy all aphides at all times.)

JANUARY.

COMMENCE firing; temperature about 45° to 50° in day time. Water the trees when placed in the house, and give more when needful.

FEBRUARY.

While trees are in flower give as much air as possible; use the pollen duster, whether the camel's hair pencil or the feather grass. Syringe the trees after fruit is set, and keep a moderate heat. Water moderately.

MARCH.

Pinch the growing shoots: after the fruit has stoned apply stronger heat, give plenty of air when possible during the day. Syringe morning and evening twice a week if weather is hot and sunny. Water about twice a week.

APRIL.

Surface-dress trees. Water twice a week with water soaked during one night in fresh horse-droppings.

Pinch growing shoots. Cut out all superfluous shoots. Admit air freely, and heat during the day up to 70°. Be careful to prevent burning from sun by opening ventilators. Syringe freely, in the morning or evening, three or four times a week. Smoke with tobacco rag if requisite. Watch aphis.

MAY.

Give air freely, and wash with sulphur in water heated to 150° on any appearance of mildew. Continue syringing, and water as for April. Give air freely, and keep up a strong heat.

JUNE.

Give plenty of air and heat. Surface-dress the pots. Syringe freely morning and evening until the fruit is colouring. Take all trees that have done fruiting out of the house; plunge them in the soil, and see that they have water.

JULY.

Turn out all the plants that have fruited. If the soil is ready repot as many as possible.

AUGUST.

Repot all the trees intended for forcing again. Keep them out-of-doors, plunged and watered. If the house is free, clean and wash as far as possible.

SEPTEMBER.

Keep the trees out-of-doors; repot when not done earlier.

OCTOBER.

Put the trees in the house. Water the pots. Wash the trees with quassia and soft-soap. Keep the house open.

NOVEMBER.

The same as October.

DECEMBER.

The same as November. For very early fruit begin forcing about the 10th.

A DESCRIPTION OF SOME SELECTED FRUITS TO BE GROWN IN ORCHARD-HOUSES.

PEACHES.[1]

Alexander. An American sort; no doubt a gain. In my note-book I find the following entry, May 25, 1878. Alexander peach—large; colour, bright red; flesh, white; one of the finest early peaches in the forcing house. It is equally good for forcing and for ordinary culture. Flowers large and bright.

---

[1] The R indicates that the peaches and nectarines are seedlings raised here from fertilisation with the Stanwick, which certainly has produced greater vigour in the tree and more flavour to the fruit.

Early Beatrice (R). Ripe July 6 to 10. Small, very bright red flowers; good, but not rich; valuable for its precocity. Flowers large.

Early Louise (R). July 10 to 16. A fair sized peach, very good, does not detach itself freely from the stem, and consequently requires care in picking. This is a very valuable early peach. Flowers small. The tree forms a good pyramid.

Early Rivers (R). July 16 to 20. A very fine peach of exquisite flavour; it is very large. This sort is liable to produce fruit with split stones; when well cultivated this is a very fine peach. The flowers must be carefully fertilised. Flowers large.

Early Leopold (R). July 20 to 25. A good early peach; large, and very hardy and productive. Flowers small.

Hale's Early. July 22 to 30. A very large and good peach. The colour of the fruit is a very deep rich red; it does not bear so freely as some sorts, and the tree does not make a good natural pyramid. It requires care in pruning. Flowers large.

Rivers' Early York (R). July 25 to 30. A very good peach; the fruit is large, high-coloured, and rich in flavour. It is an abundant bearer, and the tree forms a good natural pyramid; as a forcing peach it is one of the best. Flowers large and brilliant.

Large Early Mignonne (R). A seedling raised here from the Early Grosse Mignonne, which it precedes in maturity; it is a very large and good peach, and forms a good pyramid. Flowers are large.

Early Grosse Mignonne (R). August 1 to 10. A well-known sort, good for forcing and general cultivation. Flowers large.

Condor (R). August 10 to 15. This is a fine sort, good at all points. The fruit is large, brilliant in colour, and delicious in flavour; the tree makes a good natural pyramid, grows well, bears well, and forces well. Flowers large.

Merlin (R). August 15 to 20. Excellent, raised from the early Grosse Mignonne. Flowers large.

Magdala (R). August 20 to 25. Excellent, flowers medium, neither large nor small, a very fine peach.

Grosse Mignonne. August 25 to 30. A well-known sort. Forces well. Flowers large.

Dr. Hogg (R). August 25 to 30. A brilliant fruit, large and very good. Forces well. Tree grows with plenty of wood. Flowers large.

Crimson Galande (R). A very large and brilliant peach; raised here from the Galande; a very fine sort.

Alexandra Noblesse (R). August 30 to September 5. This is a seedling from the Noblesse. My attention was attracted to it from the peculiar character of the leaves, so unlike the Noblesse in having glands and being crenate, the leaves of the older type of Noblesse being serrated and without glands. It is a superb peach in quality, size, and appearance. This sort gives its fruit freely, and in this respect it is not like the Noblesse, which will produce long naked shoots unless carefully watched. Flowers large.

Royal George. September 1 to 10. A well-known sort, liable to mildew, but very fine and good.

Barrington. September 10 to 15.
Walburton Admirable. September 15 to 20.
Late Admirable. September 20 to 25.
(All fine late peaches.)

The '*Nectarine*' peach (R). September 10 to 20. This is a very good peach for presents. It is a good peach for packing, as the flesh is very firm and nectarinelike; hence its name. The tree is remarkable for its fertility; it makes a good natural pyramid. I consider this variety very good for market; the flavour is excellent.

Princess of Wales (R). September 15 to 20. This is a superb peach; it is very large, of brilliant colour and delicious flavour. The tree makes a good natural pyramid, and is easy to train. Flowers large.

Albatross (R). September 20 to 25. A splendid peach, following the Princess of Wales. The fruit is very large. A good pyramid. Flowers large.

Gladstone (R). September 20 to 30. This is a very fine peach, ripening after the Princess of Wales. It is remarkably fertile when forced, although it is not necessary to grow very late peaches in a forcing-house, as early peaches will ripen in a cool house at the same time the late sorts are ready in a forcing-house. Flowers small.

Osprey (R). September 25 to 30. A very large peach of very racy flavour, continuing the series of late peaches of high quality. Flowers small.

Lady Palmerston (R). September 25 to October. It is difficult to fix an exact date for the time of ripening of late peaches, as so much depends on the weather. This sort is yellow, and, contrary to the general character of the yellow-fleshed peaches, it has a very fine and distinct flavour. The fruit is large and handsome. Flowers small.

Lord Palmerston (R). September 25 to October. This is a noble-looking peach, and is very ornamental both on the tree and off. It is unfortunately too much allied to the Pavies or Clingstone peaches to be grown in a choice and limited collection. I have, however, eaten fruit remarkably good in some seasons. Flowers large.

October peaches are apt to be deficient in flavour out of doors if the season has been cold and wet. Under glass, if high flavour is desired, a moderate warmth must be kept up in the house. Apply fresh manure to the trees, as during the long summer the trees will have exhausted the soil. The best October and November peaches are the Desse Tardive, the Comet, the Salway, and Crawford's late peach.

The following peaches are excellent for forcing:—

Alexander.
Early Louise.
Condor.
Large Early Mignonne.
Early Grosse Mignonne.
Grosse Mignonne.
Hale's Early.
Royal George.
Alexandra Noblesse.
Princess of Wales.
Rivers' Early York.
Early Alfred.
Dr. Hogg.

Large-flowered peaches and nectarines add very much to the beauty of the house when flowering. The small-flowered sorts should not, however, be excluded, as many are desirable for the quality of the fruit.

NECTARINES.

Few fruits have undergone such a decided change in size and quality during the last few years. The ordinary nectarine sold in shops is about the size of a plum, thin and watery in flavour, very far removed from the luscious idea that the name of a nectarine excites in the palates of those who do not possess orchard-houses. This advance, of which I may claim to have been the principal promoter, has been caused by the intermixture of the Stanwick nectarine with the ordinary and well-known sorts. When my father first received and fruited the Stanwick nectarine, I suggested to him that the size and peculiar flavour would be valuable for the purpose of the production of another race of nectarines, superior in size and quality to those already known. The Victoria was the first result of the hybridisation, and after this successful attempt I employed the Stanwick nectarine largely as a fertilising agent; and the sorts produced, I can say with perfect faith, are, when well grown, most delicious fruits. The following sorts, arranged in order of ripening, are some of the seedlings produced from the varieties employed for fertilisation.

Advance (R). About July 29. This is the first large nectarine; it is very rich and good, and should be allowed to shrivel on the tree. Though not so large as the sorts following, it should have a place in every house. The leaves are serrated and have no glands; the flowers are large, and the tree makes a good pyramid.

Lord Napier (R). This is without exception the fruit in which I take the greatest pride, having obtained it. With proper treatment it attains a large size, many of the fruits measuring last year (1878) 8½ inches in circumference, and 5½ ounces in weight. The colour of the fruit is very beautiful, generally ripening the first week in August in a cool orchard-house. The flavour is remarkably racy, differing totally from the ordinary nectarine. The tree forms a good natural pyramid, producing plenty of shoots, so that it is rare to see a leafless branch. It is an excellent sort for forcing, always setting the fruit freely. The flowers are large, and the leaves have kidney-shaped glands.

Stanwick Elruge (R). Another seedling which early asserted its superiority, being raised and fruited with some scores of other sorts. It is a large red fruit with the Stanwick flavour, distinct from the Elruge in its precocity and size. The tree sets its fruit very freely, and gives a good supply of shoots for pruning—an absolute necessity in all orchard-house trees—and forces well. It ripens soon after the Lord Napier.

Rivers' Orange. A fine, large, yellow-fleshed nectarine; very good for forcing and for the unheated house. The flowers are large and brilliant in colour. This and the cognate yellow-fleshed nectarines are indispensable. When allowed to hang upon the tree until partially shrivelled, they become almost cloying in their lusciousness; the yellow-fleshed peaches, on the contrary, are not rich, and are inferior to the green-fleshed sorts. The cause of this change in fruits so nearly related is curious, and is a chemical problem worthy of an attempt at solution.

Improved Downton (R). A barbarous name, but exactly descriptive. This is a fine sort, following the Rivers' Orange; it is very large and good, with a Stanwick flavour, and results from hybridisation of the Downton and the Stanwick. The tree makes a good pyramid, and sets fruit well; it is good either for forcing or the cool orchard-house. The flowers are small.

Byron and *Dante* (R). May be bracketed (that the Englishman is equal to the Italian, no one will dispute). Both are large nectarines with yellow flesh, alike and yet distinct. The first was raised, singularly enough, from a green-fleshed late nectarine, called the Late Melting. It has all the attributes and the excellence of the Orange nectarines, from which Dante was raised. These nectarines succeed each other, and are good either for forcing or the cool house; flowers of both are large and brilliant. In fact, apart from the fruit they would be pretty to be grown as flowering plants alone.

Albert Victor (R). A very large nectarine. For a nectarine it is enormous, and will effectually eclipse ordinary fruit exhibited if the grower is skilful. It must be thoroughly ripe and partly shrivelled before gathering.

Spenser (R). This is one of my recent introductions, and I think one of the best. The fruit is very large and beautiful in colour; it is good for forcing and the cool house, where it ripens from September 7 to 10. This is also a fine fruit for growers for exhibitions; it is also perfectly distinct in flavour and appearance from most of the other seedlings, and with the two following will be found very interesting sorts. Flowers large.

Milton, Newton (R). These are, like the foregoing, very large and good; all ripen within a few days of each other, and all are worth possessing, as they are distinct in flavour although belonging to the same group.

Pine Apple (R). A yellow-fleshed nectarine, a seedling from the Rivers' Orange, but later, and continuing the season of the yellow-fleshed nectarines, which I should like to see last until November. The fruit is very large and delicious. The tree makes a good pyramid naturally; it forces well and always sets well.

The flowers are very large and brilliant, and no orchard-house should be without it.

Victoria. Is at present the best late nectarine that I know; it is very large, and when grown in heat it is a superb fruit. The first specimens of this sort which my father sent to Dr. Lindley elicited enthusiastic admiration. If grown in a cool orchard-house heat must be given at the close of the summer. The tree makes a good pyramid, and the fruit sets freely. The flowers are small. This is the largest late and good nectarine.

It may seem egotistical to give the names of so many of my seedling varieties, as most of the peaches and nectarines in the foregoing lists are. My apology is that I know them to be as good as the older sorts, and believe them to be better.

Of the old sorts of nectarines the following are the best, and so well known as not to require description here:—

Violette Hâtive.
Elruge.
Hardwicke Seedling.
Pitmaston Orange.
Balgowan.
Downton.

All the sorts of nectarines given here force well.

APRICOTS.

There is not much variety amongst apricots. The varieties of *Pêche de Nancy*, called in England the 'Peach' Apricot, which is probably the prototype of the Moor Park and its varieties, comprise the best and largest.

The following selection prolongs the season, and are all good.

VARIETIES OF 'PEACH' APRICOT.

Oullins Early Peach. From my note-book I see that this variety, for four consecutive years—from 1865 to 1869—ripened in the orchard-house from June 30 to July 6. It is very good and rich.

Précoce d'Oullins. Also a sort of the same type, and ripening at the same time. The sort undoubtedly differs from the *Pêche d'Oullins*, but not enough to have the two varieties in the same house.

Early Moor Park, Blenheim, Moor Park, Peach (*Grosse Pêche* or *Pêche de Nancy*). All these fine and rich, succeeding in period of ripening.

Pourpre Tardif. Very rich and good; does not apparently bear well.

To retard apricots place them outside the house, in a wire house if possible.

VARIETIES NOT OF THE PEACH RACE.

Alberge de Montgamet, or *Large Early Montgamet.* Very hardy and good. Early, about June 25. The tree is vigorous and the fruit large.

Royal. Fruit not large, but very good. Productive.

New Large Early. A seedling raised here; a large and good sort.

St. Ambroise. Very large; not always rich in flavour.

Kaisha. Fruit rather small, but rich and good. The flesh of the fruit is clear and transparent.

NOTE.—All the above ripen before the Moor Park. I have received several sorts, with new names, but I cannot at present see anything very new or excellent in their qualities. I do not, therefore, give their names.

Viard.—A sub-variety of the Peach Apricot, ripening later; but, as the Peach can be retarded, this variety is not a necessity. Apricots are not supposed to take kindly to pot culture; they only require study.

ALMONDS.

SULTAN—THIN-SHELLED—PRINCESSE.

Green almonds are nice, but, as the trees require the same care as the peach, unless the house can afford the room, they are almost superfluous. The above sorts are the best.

CHERRIES.

ARRANGED IN ORDER OF RIPENING.

These are very productive under glass, and the trees when loaded are charming; they are beautiful in flower and still more beautiful in fruit.

Early Rivers. In very hot seasons this will ripen in May; generally it is ripe early in June. It is a delicious cherry, large and black. This sort has a very small stone; it is a seedling, raised here from the Early Purple Guigne; it is hardier, and a better cherry.

Early Lyons (*Rose de Lyons*). After the Early Rivers. A very fine large cherry.

Empress Eugénie. An Early May Duke. Very good.

Bigarreau Jaboulay, Early Red Bigarreau, Governor Wood, May Duke, Early Red Guigne, Early Black Bigarreau, Bohemian Black Bigarreau. These are all fine cherries, ripening in June.

JULY.

Bedford. Prolific.

Bigarreau Noir de Schmidt. This is a very large and fine cherry, black and very luscious.

Bigarreau White. The earliest Bigarreau introduced into this country; it was brought here during the reign of the Empress Catherine of Russia, after the conquest of the Crimea.

Bigarreau Reverchon, Elton, Large Black Bigarreau, Large Red Bigarreau.

The Bigarreau cherries ripen thoroughly under glass, which they seldom do out of doors. The fruit is very good and specially wholesome.

Archduke, Duchesse de Palluau, Gloire de France, *Royal Duke.* Duke cherries. The flesh of the Duke cherries is more juicy and tender than the Bigarreau tribe, but not so rich.

Bigarreau Reverchon, Bigarreau Napoléon, Florence, Late Black Bigarreau, Late Purple Guigne, Monstrueuse de Mézel.—(This is a very large cherry.)

Rival, Late Duke.

PLUMS.

ARRANGED IN ORDER OF RIPENING.

Plums are excellent for pot culture.

Early Favourite. With very little protection and shelter under glass this sort will ripen about the middle of July; it is not large, but sweet and good.

Early Prolific. Although this is hardly a dessert plum, it is very good in the orchard-house; it is a prodigious bearer, and the fruit must be severely thinned. Ripe, middle to end of July, after the former.

Early Transparent Gage. A very early and superb plum of the family of the Gages; it is large and very rich, almost transparent when ripe, with a very small stone. I consider this plum very valuable for pot culture, walls, or standards. The fruit is produced profusely, and must be thinned carefully. First week in August.

The Czar. A large purple plum, raised from a stone of the Prince Englebert. The period of ripening is about the first week in August, but it is much earlier under glass; the tree produces fruit profusely, and it requires thinning.

Sultan. Also a large plum, red in colour, and very good; ripens about August 10.

The Grand Duke. This, I think, will be one of my best seedlings; it is very large and late, being ripe on the tree about October 15; it is exceedingly rich and juicy. Owing to the facilities afforded by cultivation under glass, I have raised hundreds of seedling plums; the above are a few selected specially for pot culture. I have many others under notice and study, which I hope to be able to describe in the next edition of the 'Orchard-House.'

The foregoing varieties are seedlings raised here from sorts fertilised under glass:—

The Green Gage and its Relatives. The qualities of the Green Gage are so well known that it is hardly necessary to describe it; the following varieties are all good, and ripen successively:—

Oullins Golden (early in August; the other sorts follow), *M'Laughlin's*, *Green Gage*, *Bryanston*, *Lawrence's Gage.*

Reine Claude du Comte Hathem. A purple gage of high excellence.

Purple Gage.

Transparent Gage. Very large and rich.

Reine Claude de Bavay. This will last some time on the tree under glass, and become very rich.

OTHER SORTS OF PLUMS IN ORDER OF RIPENING.

Early Orleans, *De Montfort*, *Belgian Purple*, *Jefferson*, *Angelina Burdett*, *Decaisne*, *Prince Englebert*, *Victoria*, *Pond's Seedling*, *Late Black Orleans*, *Ickworth Impératrice*. All large and good; will bear retarding or accelerating.

Coe's Golden Drop. This will hang on a pot-tree, under glass, into November, and become very rich and good.

GRAPES.

Although vines must not be suffered to cover the roof of the orchard-house, yet, with judicious management, a vine can be placed so as not to shade the trees under. In pots they are orchard-house trees. The following sorts are good. I have placed, as far as possible, in order of ripening:—

Frontignan Early Auvergne, *Frontignan Early Saumur*, *Frontignan Early Silver*, *Frontignan Early Smyrna*, *Frontignan Primavis*, *Frontignan Tokay*. All the above are comparatively small in size of berry, but are remarkably distinct in flavour. When thoroughly ripe they are very rich and good; the White Frontignan is the type: all the Fontignans are good sorts for cultivation in pots.

Early Ascot, *Ascot Citronelle*, *Chasselas Royal*, *Royal Muscadine*, *Chaptal*, *Foster's White Seedling*, *Buckland Sweet Water*, *Chasselas Vibert*. These are white grapes, of the Muscadine race, without the Frontignan flavour; the berries are larger than the Frontignans, and are excellent grapes for pots; they are very sweet and good when fully ripe. Although placed in order of ripening, there is little difference in the period; as a rule, most of them are ripe from the middle of September.

Esperione, Black Hamburg. Both of the Hamburg race, ripening in a cool house, and too well known to need description.

Madresfield Court. A black Muscat of recent introduction; from its flavour, size, and hardiness, it is worth growing in every house.

Black Alicante, Lady Down's Seedling, Gros Colman, Gros Maroc, are large black grapes, which require heat to ripen them thoroughly.

Muscat of Alexandria, Muscat Hamburg, Mrs. Pince's Black Muscat, also require heat.

FIGS.

The two most useful sorts for an orchard-house, in pots, are the Brown Turkey and White Marseilles; but the following are all good:—

Early Violet, Brunswick, Negro Largo, Brown Turkey, Du Roi, Abondance Précoce, Angélique, White Marseilles.

PEARS.

If the peach is the queen of fruits, the pear is undoubtedly the king; the infinite variety of flavour, the size and colour of the fruit, the abundant produce in genial climates, and the strength and hardiness of the tree render it worthy of the praise freely and unanimously accorded for ages. The literature of the 'pear' would fill a library. In our climate, unhappily, it must be placed amongst the fruits which require shelter, albeit that no orchard should be without pears. For pot culture the largest and finest sorts only should be used. As far as I know, the following sorts are the most useful—my experience of them is personal—arranged in order of maturity:—

AUGUST.

Jargonelle, Beacon, Clapp's Favourite, Bon Chrétien, Williams, Beurré de l'Assomption.

SEPTEMBER AND OCTOBER.

Beurré Superfin, Summer Beurré d'Aremberg, Madame Treyve, Souvenir du Congrès, Louise Bonne of Jersey, Beurré Hardy, Conseiller de la Cour, Marie Louise.

NOVEMBER AND DECEMBER.

Van Mons (Léon le Clerc), Baronne de Mello, Durandeau, Glou Morceau, Beurré Diel, Doyenné de

Comice (this pear is sufficient for November and December), Beurré Bachelier, Pitmaston Duchesse (should be in every collection), Passe Colmar, Princess, Beurré d'Aremberg.

JANUARY.

Winter Nelis, Joséphine de Malines, Marie Benoist.

FEBRUARY AND MARCH.

Beurré Easter, Bergamotte d'Esperen, Olivier de Serres, Passe Crassanne, Beurré Rance.

I have not described the pears, as descriptions are given almost *ad nauseam*; it is sufficient that all the sorts named are good. Of course there are other varieties equally good, but it is difficult to give a list of all.

APPLES.

VARIETIES ADAPTED FOR AN ORCHARD-HOUSE.

In the South of England it is hardly necessary to grow very early apples, as they ripen at a time when plenty of other fruits are more popular. The following list gives sorts which ripen in succession from August to May.

AUGUST TO SEPTEMBER.

Mr. Gladstone, Red Juneating, Irish Peach, Red Astrachan, Red Quarrendon, Mother.

OCTOBER, NOVEMBER, DECEMBER.

Cox's Orange Pippin. This is worthy to be grown with any fruit under glass; the flesh, with the additional warmth, becomes remarkably rich and good. Ribston Pippin, Scarlet Golden Pippin, Scarlet Nonpareil, Braddick's Nonpareil, Washington (a very fine sort, requires the climate of the orchard-house or wall), Calville Blanche, M'Clellan.

JANUARY TO MAY.

Northern Spy, Blenheim Orange, Ribston Pearmain, Mannington's Pearmain, Melon, Lord Burghley, Reinette de Canada, Allen's Everlasting, Newtown Pippin.

There are, no doubt, other sorts worth growing. Every village has its favourite apple; but the above will be found worth growing in the orchard-house. Apples have been so much described that I have not thought it necessary to add detailed descriptions.

SOIL FOR POTTING FOR PEACHES, NECTARINES, AND KINDRED FRUIT-TREES.

A calcareous sandy loam is the best; it should be dug and thrown up in a ridge, not less than three months before use; but it is better to keep it for nine or twelve months. Mix at the time of ridging about one-third of its bulk of good stable manure, and again, when used, mix the same proportion of well decomposed manure; keep the soil dry for a month before using, but it is not necessary to keep it under cover when thrown up. Some soils are very tenacious, and where the roads are mended with gravel, road drift is an excellent material to use for the purpose of lessening this quality. In limestone districts do not use the road drift. Search and destroy all larvæ.

SURFACE-DRESSING.

This must not be confounded with the soil for potting; it must be used on the surface only. If mixed with the soil when potting the trees, it will assuredly injure the roots. The following has always proved very good here.

Horse-droppings from the roads, two-thirds; one-third of kiln dust; that is, the dust gathered from the floor under the malt kiln, which is used largely for agricultural purposes, and differs widely from malt combs, which are used for feeding. Spread the horse-droppings and the kiln dust in a bed about 6 or 9 inches deep, and saturate it with cesspool water. Use the day after mixing. The spreading out prevents fermentation, which is not necessary. If malt dust cannot be procured, use finely-chopped rotten manure, or loam with the horse-droppings. The object of the use of the surface-dressing is to allow the water to carry down the salts in dilution. After the water has done this the young roots will rise to feed on the compost, but until tempered by water it would be too burning, and for this reason it must be used only as directed, viz. on the surface.

If thrown up for fermentation, the nutritive principle—which is evident from the growth of the trees under its influence—would be extracted, hence the necessity for immediate use. The kiln dust may be bought and thrown up in a small ridge, and kept for months before use without detriment.

GENERAL REMARKS.

An orchard-house must be light, dry, airy, and scrupulously clean as to rafters and brickwork. Lime-wash all brickwork in the autumn, when the trees are at rest. Paint rafters as often as required, and thoroughly fumigate; wash all corners and insect-holes with carbolic acid: this will drive away a demon. Use calcareous soil for peaches, nectarines, apricots, grapes, cherries, plums, pears, and apples. Use ferruginous soil for oranges.

Water freely as directed in morning and evening; attend particularly to syringing in hot weather. In sudden sunshine and heat attend specially to abundant and complete ventilation. Sluice the soil of the house abundantly when watering the trees; this creates evaporation.

Surface dress with the compost recommended. Use guano and all artificial manures with great caution.

Keep a careful watch for aphis; this insect will ruin all the trees if suffered to gain the upper hand; it is easily destroyed by attention. Turn out the ants. When necessary, use carbolic acid for their nests, but do not pour it into the pots; it will certainly kill the trees.

Recollect that trees under glass are in an artificial climate.

Select all the sorts of fruits with a view to successive ripening. The orchard-house should begin with cherries, and finish with plums and pears in October and November. Many pears will hang on the trees into November, and be good.

An orchard-house belongs to the kitchen-garden, but they may be very ornamental. In choice of site, an open and sunny position is indispensable. In a windy place, the house must be strongly built. The trees will not suffer from the open position, provided the wind through the house is tempered.

Keep out birds and wasps when the fruit is ripe; put netting round the ventilators in June, when the summer begins and the house is constantly open.

When the peaches are ripening, they may be kept for a week after gathering; it is sufficient to put them in a cool place; gather three or four days before they are thoroughly ripe, if you want to keep them or to send them away.

Have a gardener who understands and likes his work. An orchard-house with intelligent supervision will produce more in one year than walls will yield in five, and will give an annual production.

BEES

Are undoubtedly the best fertilisers. This year, although the weather has been inclement and the bees rarely issued from their hives, they contrived to take all the pollen from five houses filled with fruit trees on bloom; their industry and genius for discovery is incredible, the houses being at some distance from the hives; unfortunately a few—although not to the detriment of the hives, as far as I can judge—fall victims to their inability to distinguish the glass roof from the outer air. If the bees are very busy, the doors at both ends should be open; the current of air flowing through directs the insects to the path of egress.

ORANGES.

Oranges cannot fail to increase in popularity when their culture is understood; they are the most ornamental trees during the winter, and the house need not at any time stand higher than 45°. This year—1879 (my oranges were ripe in November 1878)—the house has yielded a continual supply of fruit for dessert without decreasing its ornamental look, and in May there is still a good crop of highly flavoured fruit, which has lasted for six months in the same condition. No other known fruit has this extraordinary and wonderful property.

APPENDIX.

I.

THE RATIONALE OF ORCHARD-HOUSE CULTURE.

(From an article by Thomas Rivers in the 'Cottage Gardener,' No. 587, pp. 189, 190.)

I do not think the rationale of the culture of orchard-house trees in pots has yet been given, or perhaps thought of. I am, therefore, tempted to break into the subject; and I hope to show that this description of culture, although at first much ridiculed by some gardeners, is quite in accordance with garden physiology.

A fruit-tree four or five years old planted in, say, November 1859, will in November 1860 be found in most cases full of blossom-buds, and its roots a mass of spongioles or feeders. In November 1861, if undisturbed, it will have fewer blossom-buds and more young shoots; and a great portion of the fibrous roots or spongioles around the root-stem, which last year were so abundant, will be dead. The rootlets, or small roots, will be found making their way from the stem of the tree; each rootlet having its fringe of spongioles taking up food farther from home only because they have exhausted the mass of earth round the stem of the newly planted tree. And so, year after year, it sends out from the extremities of its roots fresh feeders. If the tree be delicate in its habits, like many of our esteemed kinds of fruit trees, the feeders soon get beyond the influence of the sun, take up cold watery sap and it becomes diseased and unfruitful.

Let me now give another side of this true picture, premising that all I write is from experience gathered from 'year to year,' and, however dull, still necessary to illustrate my orchard-house culture.

Let me, therefore, again plant a tree four or five years old in November 1859; and, instead of allowing it to remain undisturbed, take it up with all its fibres in November 1860, and replant it with a small quantity of fresh compost. In November 1861 let me again take it up. As far as my experience has yet gone, a portion of the spongioles produced in 1860 will be found decayed, but a fresh crop, induced by the removal and the fresh compost, will have sprung forth; so that the roots of the tree are still a mass of fibres or spongioles, and its branches with short annual shoots on them full of blossom-buds; and so from 'year to year,' if the tree be removed annually, the roots will always be young, near home, and easily fed.

The fruit garden may be thus completely under control. If small fruit-trees are wanted, remove them annually; if larger but still very fruitful trees are required, remove them biennially. If large trees are wished for, to be kept within bounds by the pruning-knife only, remove not at all, neither root-prune, but allow your trees to grow vigorously; and if in a highly favourable soil and climate, they will in the course of years, bear large quantities of fruit.

We now come to trees in pots. I have just examined one of my trees in a 13-inch pot, in which it has been, without shifting, seven years. It was top-dressed (as it has been annually) in October 1858, by taking out the earth about halfway down the pot from the surface, and replacing it with fresh compost, ramming it down with great firmness. The compost just removed seems to be quite exhausted, for every part of it is permeated with small fibrous roots, the greater portion of which seem to be dead or dying; so I now take it out with its mass of spongioles which have done their work, and replace it with some fresh compost, leaving a circular mass of rootlets all round the root-stem[1] of the tree untouched. These rootlets (if the tree be top-dressed in October) will immediately commence to put forth feeders: so that in October 1860 the compost will be again found to be thoroughly exhausted. It will thus, I trust, be seen that the spongioles, or principal feeders, near the root-stems, are but temporary in trees planted in the open ground; but may be made annual, to a certain extent, by the annual removal of the tree.

---

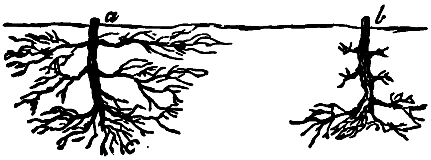
[1] That part of the tree whence the roots proceed.

By cultivating the tree in a pot, and removing it, you *force* the rootlets to be annual; and the tree, being thus supplied annually with fresh feeders and fresh food, becomes healthy, fruitful, and vigorous. It has not to ramble for its food, and therefore may be likened in its comfortable state to a plump Devon ox in a Devonshire pasture; while a fruit tree uncared for is something like a wild buffalo in a barren country.

The vine-dressers in some parts of the south of Europe seem to have for a long time known that the fibrous roots of the vine are annual; for they take away the earth from their vine-stocks in winter, with all the exhausted spongioles of the preceding season, let it lie in a ridge between the rows till spring, and then replace it with some manure. The root-stem promptly puts forth its feeders, and the grapes are thus brought to high perfection. I remember perfectly well seeing the operation of taking away the soil from the vines, and not knowing the 'reason why,' feeling much surprise at what appeared to me so barbarous a custom.

To return to orchard-house trees. There is nothing in gardening to be compared to their culture when the rationale of it is fully understood. Not only is there an annual crop of feeding-roots from above, but from below also. I have before me a stout tree seven years old taken from its pot, and find three or four large roots coiled round the bottom part of the ball of earth and fibrous roots. From these annually are put forth numerous spongioles, which make their way through the holes at the bottom of the pot. If left undisturbed, some of these become roots of considerable size, and by making their way too deeply into the border draw up too much food, giving such vigorous growth as to make the tree unfruitful. I now, therefore, have the trees lifted twice in June and twice in July, the first and the last week in each month. This prevents the roots going deeply into the border, and induces a host of spongioles to push forth, spreading themselves under the pot and on the surface of the border. If orchard-house trees be planted in the borders instead of being kept in pots, the necessity of annual removal and giving fresh compost to the roots, equivalent to the annual top-dressing given to potted trees, will be at once apparent.

FIG. 24.



a Roots of Zante vine, unpruned. *b* Roots of Zante vine, as pruned and exposed during the winter.

With orchard-houses, either lean-to or span-roofed, properly ventilated at the sides, ventilation freely given, and regular syringing, no failure can take place. All kinds of fruit can be cultivated in them; and when one sees, as I often have, the fine crop of pears, plums, peaches, &c., grown on well-fed little trees, no surprise will be felt at the enormous extent this kind of culture has now arrived at.

P.S.—The following letter I received from an American friend, which, bearing as it does on annual root-pruning, seems of much interest. He was deputed, by the United States Government, to travel to Europe to look into the details of vine-culture. The following extract alludes to the subject:—'I have your letter on a matter which interested me greatly last winter while in Zante and Cephalonia, where I found they not only took away the earth from the vines, from nine to twelve inches in depth, but also cut off all the roots within six inches of the surface close to the stem. The stumps of roots will, of course, throw out plenty of feeders into the earth, which is drawn around them again after being fertilised by exposure to the atmosphere, and by the usual quantum of stable-manure spread over and mixed with it. Now if the practice of the Greeks with the Zante currant is in accordance with sound physiological principles, I can save at least 500 dollars an acre in the formation of my vineyard, by dispensing with the deep rich soil, having depth only for drainage, and putting my manure annually near the surface, to feed the spongioles formed annually.'

It will be seen, from this extract, that what had been considered here a new doctrine and practice—viz., that of annually taking away the surface-roots of orchard-house trees in pots, and giving them fresh food, a practice the result of pure accident—is very ancient, and has, probably, been followed by the Greek vine-dressers from time immemorial.

II.

(*Extracted from the 'Quarterly Review' for October* 1859.)

'I AM more than ever convinced of the superiority of fruit-houses, especially in this island (Ireland) over walls. I have adopted the opinion that glass and timber are cheaper than brick and stone; that is to say, that a given quantity of the superior fruits can be produced in a fruit-house costing a less sum than walls producing the same quantity, even without taking into consideration the much greater certainty of crops from the trees being protected, but assuming the walls to give fair average crops. My new house is all timber and glass, with a triple span-roof, 84 feet long and 60 wide, the centre span 1½ foot higher than the two side ones. In this centre division is a bed 19 feet wide, and here I have planted my pyramidal pears, most of which are now 10 feet high, splendid trees, and full of bloom. They are 6 feet apart. Altogether there are 16 of these in the house, and about 100 peach, nectarine, plum, and apricot trees. The effect is very beautiful, all being now in bloom: some of the pears are magnificent. The sides of the houses are glazed down to the ground, the sashes being hung on central pivots, and all readily opened. I have more light than I ever saw in any other house, and the ventilation appears all I could wish; and these I take to be two cardinal points for producing good fruit. I propose to grow vines to all the pillars inside; strawberries in the side borders; and I know not what else I may try, for I have still much room to spare. I am keeping an account of the temperature, to compare with that of the open air. In February the mean height was 3° above the outside, and in March 5½°; and it will doubtless be greater during summer and autumn. One reason that induced me to erect so large a structure was an almost uniform want of success with the pears; for although I took great care in protecting them when in bloom, yet late frosts almost always caused the fruit to drop, so that scarcely one tree in ten gave a fair crop. My house is handsome and well-finished—indeed, rather too well, for it has cost me about 500*l.* There is a good deal of extra work which might be saved, and I have little doubt the same-sized building might be erected for 1*s.* 9*d.* per foot square of ground covered.'

In a recent communication from Mr. Bewley, he says: 'I often see, or fancy I see, a very close analogy between animals and plants. Now the harder *we* work by day, the more thorough is the rest we require by night; and is it not so with plants? So I say, give plenty of air by night to the orchard-house trees, to allow them to *rest* in a low temperature; and, having rested, work them hard by day, by diminished air and consequently higher temperature. I believe few are aware how much heat plants will bear in broad daylight, if they be allowed perfect rest at night.

'Surely it is the close warm damp atmosphere at night that draws our plants, not heat by day: we meet with no such thing in nature analogous to our houses at night, as they are usually treated. Out of doors the air is always in motion—radiation must cause it to be so.

'I do not think 90° to 100° of heat would injure my trees on a sunny day; and our practice is to give plenty of air all night, to syringe early, and, as the sun gets somewhat high, and the excess of moisture evaporated, to reduce the air until the house gets hot, and to keep it so all day, thus taking advantage of bright days to push on our fruits—in fact, to "make hay while the sun shines." When somewhat cool we syringe again, and open every light. This is my plan for obtaining good wood and high-flavoured fruit. And is it not as near an approach to nature as possible?

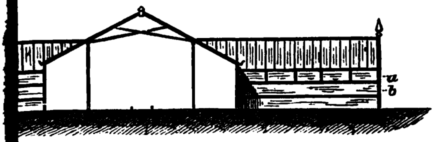
'I annex a comparative statement of the temperature, from February to September inclusive, of the external air and in my orchard-house, by which you will observe that during these eight months the latter has the advantage of nearly 5¼° over the former. Is not this equal to nearly five degrees of latitude?

	Outside Temperature	Inside Temperature
	Degrees	Degrees
February	43·62	47·35
March	46·03	50·43
April	45·61	50·75
May	50·84	59·30
June	58·05	64·71
July	64·38	68·82
August	60·45	64·30
September	55·66	60·30
Mean	53·08	58·24

'I must merely add, that in dull sunless weather, there is very little difference between inside and outside temperature.'

Fig. 27 is intended to represent a design for an orchard-house on a novel principle; the tramways may be improved by the addition of turntables. The spaces between the wings of the house will be useful for the protection of various plants, and the tramways should be used for the conveyance of the fruit-trees into their summer border.

To face page 256



SECTION ON LINE .A.B.

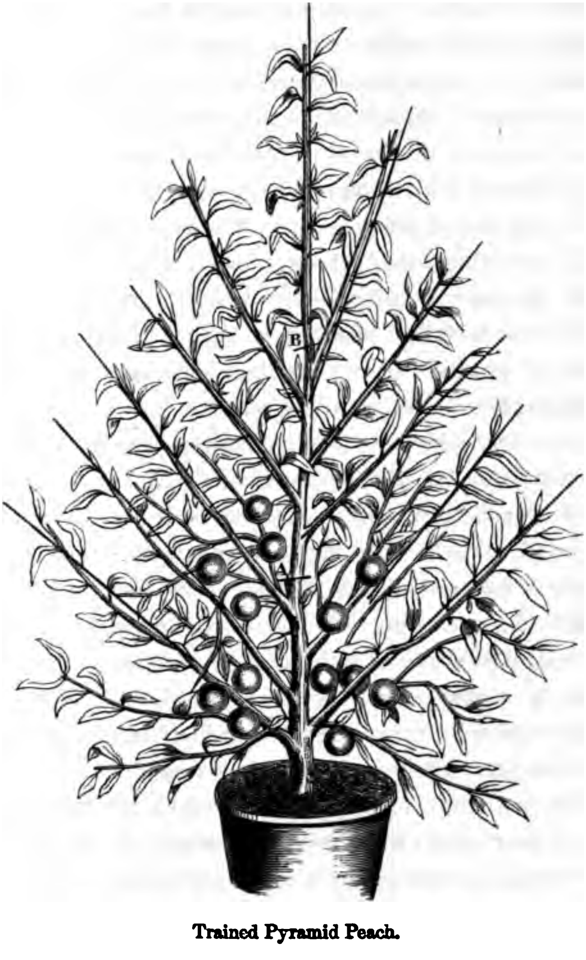
SCALE OF FEET.

III.

Before closing this edition, I find that I have omitted to say a few words upon scientific training. The directions given in the work are for rough-and-ready training, which is within the reach of any amateur, and does not consume much time. Elaborate training is another matter; but I confess that it has my best wishes. A dandy is an orderly and regular person; and trained and dandy trees must be orderly and regular at least; but that the produce of fruit is not greater than the rough-and-ready pruning is likely enough. To give diagrams of the various methods employed by the Belgian and French professors of this art, would be an endless work, and would, in fact, require another book. It is sufficient to say that, for the practice of this training, all that is necessary is to select a certain number of branches radiating from the main stem, and to order these as symmetrically as possible. If for a pyramid, choose those branches that are equi-distant; if for a bush, choose those that will admit most sun and air. Have ready a number of light willow or deal rods; lodge the bases of these rods against the stem or any branch that will bear the strain, and tie out the young shoots; keep them straight, and the effect produced by a skilful hand will be at once apparent. With old pyramids which are *tant soit peu* cranky, press down the rough branches with a hoop of willow, the hoop being as much as possible on the most elastic part of the branches, this naturally being the young growth. To these hoops radiating rods must be tied; the shoots so tied out must be pruned according to the directions, the only difference being that more labour is necessary. I am bound to say that a well-regulated tree will give the operator a better basis for pruning and regulating the supply and the position of the fruit. Contrary to my usual practice, I have not carried out this system to any extent; but I hope before the next edition to exhibit specimens of trees, as carefully and symmetrically trained as the large geraniums and roses so familiar to the *habitués* of our great flower exhibitions.

It is the business of the nurseryman to provide the trained trees in a young state, but if an amateur wishes to train his own trees, the following directions may assist him:—We will suppose that a maiden or dwarf tree is purchased, and that the tree is provided with prominent and well-developed buds at the base. Cut the stem down to five buds, one of these to be the main or upright shoot and the other four to form the lateral shoots. When the tree is potted and the tree is breaking, in other words, growing, fasten a stick to the stem and tie the leading shoot to this stick. Insert four light willow rods between the stem and the centre stick, paring off the ends of the sticks for the insertion, and with these make the supports of the four lateral shoots. For the first year steadfastly pinch the

FIG. 26.



Trained Pyramid Peach.

lateral shoots which will be produced from the main shoots, which are tied to the sticks, and in the autumn the first series of the tree of which the engraving is given will be made. The same process must be repeated in succeeding years, a stouter stick being needed for the support of the main stem. The pinching of the summer shoots must be done according to the rules already laid down; in fact, with the exception of the tying out of the shoots to the training sticks, there need be no difference in the treatment. There is no doubt that the trees in a house thus trained will appear very well cultivated, but there is no reason to suppose that they will produce more fruit than untrained trees, and to keep them in proper order very much more time and attention will be necessary. The methods of training advocated by Mr. Dubreuil may be applied to pot trees, but I do not think that in his system he contemplated the application of it to trees in pots under glass. In giving a figure of a tree trained as a pyramid, I have merely indicated that with additional time and attention trees in pots may be trained very symmetrically, but there is, of course, the very great question of the cost of the time and attention. A good and sufficient supply of fruit may be obtained without the extra trouble, but to the eye of the horticultural artist there is no doubt but that the reward will be fully equal to the pains bestowed. I have given a sketch of a tree such as it should appear after three years of training. With the base secured by the proper direction of the sap in the beginning of the training, such a tree may be kept with a well-balanced growth for twenty years (some of my trees, untrained, are of a greater age, under glass). The main principle to be adopted is that the small lateral shoots, which the peach is continually producing, should be constantly pinched, the main lateral shoot being left untouched until it has reached seven or nine leaves.

CONCLUSION.

I APPEAR, in the foregoing pages, to have employed a great number of words in the endeavour to make plain this simple, agreeable, and novel mode of cultivating fruit trees. Judging from my own feelings, its advantages and pleasures are manifold. Each bud, leaf, and blossom is brought close under the eye of the cultivator. All the minute and beautiful operations of nature can be closely watched in a genial climate. The silvery covering of the peach's blossom-bud—the beauty of its fully developed flowers (how fresh and happy they always look!)—the anthers shedding their pollen—the germs gently swelling—the downy, ruddy, luscious-looking coat of its charming fruit, are all calculated to give pleasure to the healthful cheerful mind; for the varied works of Nature's laboratory are brought near to the eye, near to the mind, near to the heart, which is instinctively lifted in thankfulness to the Giver of all such good and beautiful things!

INDEX.

ALM CUT

Almonds, 170, 234
Ants, 173, 209
Aphides, 206
Aphis, black, 129
— brown, 173, 206
Apple, 163
— sorts, 164, 241
Apricot, 53, 232
— as an ornamental tree, 67
— as pyramids, 68
— caterpillar, 214
— compost for, 62
— culture, 60
— distance apart of, 70
— general management, 58
— in borders, 66
— planting out of, 69
— potting, 55
— pruning, 56, 57
— retarding, 66
— sorts, 67, 232
— summer pinching of, 57
April, 212
August, 218

Bees, 246
Blossom buds, 75
Borders, 9, 30, 86
— mixture for, 10
Boxes, 50
Brick walls for lean-to houses, 12
Buds, leaf and fruit, 77
Bulbs in pots, 43

Calendar, 210
— forcing house, 221
Camellia, 44
Chalk for composts, 52
Charcoal fires, 211
Checking growth, 104
Cherries, 128
— houses for, 130
Cherry, sorts, 129, 234
— summer pinching of pyramids, 128
Chirimoya, 198
Chlorosis, 216
Clingstone peaches, 111
Compost, 50, 62
Cordon peach and nectarine, 96
Coverings, 46
Currants, 166
Cut-down trees, 78

DEC

December, 220
Description of fruits, 223

Estimates, 11, 23, 36

February, 211
Feeding trees from above, 63
Fig, 133, 203
— in cellar, 135
— management of, 133
— sorts, 134, 239
Flavour of peaches, &c., 42
Flowers of sulphur on water, 209
Forcing orchard-house, 171
— calendar of, 221
— with root-heat, 178
Free ventilation, 92
Fruit spurs, 80
Fruits, tropical, 198

General culture, 42
Glass recommended, 8
Glazing, 7
Gooseberry, 166
Granadilla, 200
Grape, 151
— bushes, 154
— forcing, 155
— half-standards, 161
— pruning, 152, 158
— sorts, 155, 162, 238
Grapes on hot-water pipes, 155
Guava, 200

Heating temporary, 120
Hot-water pipes for vines, 155

NOV

Implement for top-dressing, 88
Insects, to keep off, 123
— to destroy, 206
Iron sockets for posts, 38

Jabuticaba, 203
January, 210
July, 217
June, 215

Kiln dust, 84

Laying out orchard-house, 29
Lee-Chee, 199
Lemon, 45
Liquid manure, 59
List of fruits, 223
Loquat, 199

Maiden trees, 54, 78
Malt dust, 84
Mangaba, 202
Mango, 200
Mangosteen, 198
Marangaba, 202
March, 211
May, 213
Mulberry, 166

Nabuzeiro, 202
Nectarine, as an ornamental tree, 94. For treatment, see *Peach*
— sorts, 111, 228
— Syrian, 113
Netting, for ventilators, 93, 213
November, 220

October, 219
Orange, 184
— black fungus, 193
— compost for, 191
— insects infest, 197
— Maltese, 190
— St. Michael's, 189
— Tangierine, 186
Orange-grove, how to form, 194
— scale, 197
Orchard-house, origin of, 1
— all glass, 26
— forcing, 171
— hedge, 180
— houses as sanatoriums, 36
— large span-roofed, 23
— lean-to, 5
— poor man's, 4
— portable, 38
— rationale of culture, 247
— small span-roofed, 16
— tropical, 182

Path, sunken, 9
Peach and nectarine, 71
— as an ornamental tree, 94
— 'en cordon oblique,' 96
— gathering of fruit, 115
— general culture, 82
— leaf-pinching, 106
— miniature trees of, 109
— pinching, 80
— planting out of pyramid, 104
— potting dwarf trees, 73
— pruning, 80
— pruning old trees, 90
— pyramidal, 100, 104
— retarding, 94
— sorts, 110, 223
— summer pinching of bushes, 78
Peach, summer pinching of pyramids, 100
— summer pinching of standards, 30
Pear, 136
— house, 141
— perforated pots, 114
— pinching of pyramids, 144
— sorts of, 149, 240
Plaintain, dwarf, 201
Plum, 121
— house, 123
— sorts, 122, 126, 236
— summer pinching of pyramids, 126
Pomegranate, 199
Portable orchard-houses, 38
Pots, 49
Potting, 55

Quassia-water, 207

Rafters fixed, 21
Rainwater for syringing, 35
Red spider, 92, 208
Removing trees to open air, 49
Retarding, 94
Root heat, 34
Rose apple, 202

Sapodilla, 202
September, 218
Shoots, shrivelling of, 63
Soil of house, 32
— for potting, 242
Solid surface for peach-trees, 30
Standard peach-trees, 31, 34, 48
— peach-tree culture, 32

Strawberry, 167
— compost, 167
— potting, 167
— sorts, 169
Succession houses, 14
Sulphur and lime, 209
Surface compost, 62, 88
— dressing, 243
Sweet lime, 201
Syrian nectarines, 113
Syringing, 208, 213, 214

Thinning fruit, 59, 216
Tiffany, 208
Tobacco smoke, 207
Top-dressing, 62
Trained trees in pots, 257
Trees, feeding from above, 63
Trees, number wanted, 22 *note*
Tropical fruits, 198
Trucks, 49

Ventilation, 92
Ventilators, 13, 20
— netting for, 93, 213

Water, 48, 61, 87, 211, 213, 215
Winter protection, 44
Wire net structure, 41

Year, 1st, 56
— 2nd, 58

Zante, vine culture in, 252

LONDON : PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET

The following Publications, sold also by Messrs. LONGMANS & Co., 39 Paternoster Row, can be had per post from THOMAS RIVERS & SON, Sawbridgeworth, at the following rates: –

THE ROSE-AMATEUR'S GUIDE.

Edited and Arranged by T. FRANCIS RIVERS.

Containing the History and Culture of Roses, with Descriptions of a few select Varieties, Culture of Roses in Pots, &c.

ELEVENTH EDITION.

4s.

◆

THE MINIATURE FRUIT GARDEN;

OR,

DWARF FRUIT-TREE CULTURE IN SMALL GARDENS.

Edited and Arranged by T. FRANCIS RIVERS.

With Hints for the Cultivation of the Pear grafted on the Quince Stock; the Cherry on the Cerasus Mahaleb, or Perfumed Cherry; and the Apple on the Paradise Stock.

EIGHTEENTH EDITION.

3s. 6d.

◆

THE ORCHARD-HOUSE;

OR,

THE CULTIVATION OF FRUIT-TREES IN POTS UNDER GLASS.

Edited and Arranged by T. FRANCIS RIVERS.

SIXTEENTH EDITION, Enlarged.

5s.

◆

THE CONGRESS PAPERS, 1s.

A NEW VOLUME COMMENCES IN JANUARY AND JULY.

THE JOURNAL OF HORTICULTURE,

COTTAGE GARDENER AND HOME FARMER,

(ILLUSTRATED.)

Is the most practical and widely circulated Journal devoted to

GARDENING IN ALL ITS BRANCHES;

And embracing among other Home Pursuits of the Country House

POULTRY, BEES, PIGEONS, CAGE BIRDS, &c.

Weekly, 3d.; Post-free, 3½d.

Terms of Subscription, Post-free:—One Quarter, 3s. 9d.; Half-year, 7s. 6d.; Year, 15s.

To be had of all Booksellers and at the Railway Stalls.

Office: 171 FLEET STREET, LONDON, E.C.

Works published at the Journal of Horticulture Office.

THE BRITISH FERNS, popularly Described and Illustrated by Engravings of every Species. By G. W. JOHNSON, F.R.H.S. Fifth Edition, with an Appendix, 3s. 6d. bound in cloth, gilt edges; post free, 3s. 9d.

THE PINE APPLE MANUAL; being a Guide to the Successful Cultivation of that fruit, and to the Construction and Management of the Pinery. By CONTRIBUTORS TO THE JOURNAL OF HORTICULTURE. Illustrated with Engravings. Price 2s. 6d.; post-free, 2s. 7½d.

THE ORCHID MANUAL, for the Cultivation of Stove, Greenhouse, and Hardy Orchids. By THOMAS APPLEBY. Price 2s. 6d.; post-free, 2s. 7½d.

ORCHARD HOUSES, Hints on the Construction and Management of. By J. R. PEARSON, The Nurseries, Chilwell, near Nottingham. Fourth Edition. In limp cloth, price 1s. 6d.; post-free, 1s. 7d.

THE ROYAL PARKS AND GARDENS OF LONDON:

THEIR HISTORY AND MODE OF EMBELLISHMENT.

With numerous Engravings,

And a Series of Designs of Flower Beds and Borders, with Examples of Planting them effectively according to the several styles known as Carpet, Geometrical, and Sub-Tropical Bedding; besides Notes on the Propagation and Culture of the Plants employed. Also the Artistic Arrangement of Colours, &c., by NATHAN COLE, Kensington Gardens.

DEDICATED BY GRACIOUS PERMISSION TO H.R.H. THE PRINCESS LOUISE.

Demy 8vo. cloth gilt, toned paper, gilt edges, price 5s.; by post, 5s. 5d.

GARDENING.—POULTRY.—RABBITS.—BEES.

MANUALS FOR THE MANY.

The most useful Handbooks ever published.

GARDENING, 3d.
ALLOTMENT FARMING, 3d.
BEE KEEPING, 4d.
THE GREENHOUSE, 9d.
KITCHEN GARDENING, 4d.
FLOWER GARDENING, 4d.

FRUIT GARDENING, 4d.
FLORISTS' FLOWERS, 4d.
POULTRY BOOK, 6d.
WINDOW GARDENING, 9d.
MANURES, 3d.
RABBIT BOOK, 6d.

⁂ *Any of the above can be had post free for an additional postage stamp.*

LONDON: JOURNAL OF HORTICULTURE OFFICE, 171 FLEET STREET, E.C.

T. W. BURTON,

HORTICULTURAL BUILDER,

SAWBRIDGEWORTH,

HERTS.

Estimates given for Orchard Houses, Greenhouses, Vineries, &c., fixed complete in any part of the country, or prepared ready for fixing, and delivered free to any railway station.

HOT-WATER APPARATUS FIXED COMPLETE.

FRIGI DOMO. Registered. — **FRIGI DOMO.** Registered.

MADE FROM PREPARED HAIR AND WOOL.

A perfect Non-conductor of Heat, keeping, wherever it is applied, an even temperature.

Patronised by HER MAJESTY THE QUEEN, for Windsor Castle and Frogmore Gardens; the DUKE OF NORTHUMBERLAND; DUKE OF DEVONSHIRE; the late Sir J. PAXTON, for the Crystal Palace; late Dr. LINDLEY, for the Horticultural Gardens, &c.

Mr. J. WILLARD, *Gardener to the* Baroness Burdett Coutts, *writes* :—

'With respect to the "Frigi Domo," I consider it one of the best covering materials we have. It is light and warm, and not injured by wet to the extent of most other covering materials—in fact I have a roll at the present time which has been in use three winters. I find it especially useful in low heated structures, as it is readily put on, and proves a great saving in the way of artificial heat. For this purpose, in my opinion, it is preferable to mats, and will last more than twice as long.'—Holly Lodge Garden, December 16, 1878.

Introduced by the late ELISHA T. ARCHER, *more than Twenty Years ago.*

Cut in any Lengths required.
To be had of all Nurserymen and Florists.

FOR PRICE LIST AND PARTICULARS ADDRESS:

BENJAMIN EDGINGTON,
2 DUKE STREET, LONDON BRIDGE.

GREENHOUSES AND CONSERVATORIES.

20 Medals
Who loves a Garden loves a Greenhouse too
Cowper
ART WITH ECONOMY APPLIED TO CONSERVATORIES

The First Part of our New Catalogue,

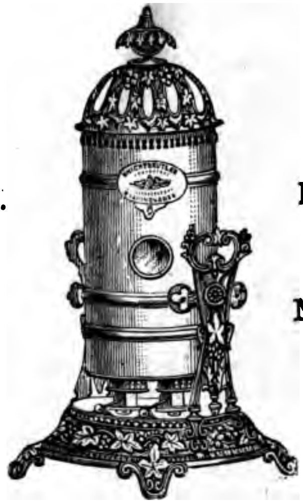
'ART, WITH ECONOMY, APPLIED TO CONSERVATORIES,'

is now ready,

***Price* 1*s*.**

T. H. P. DENNIS & CO.,
Horticultural Builders & Hot-Water Heating Engineers,
MANSION HOUSE BUILDINGS, LONDON, E.C.
WORKS, CHELMSFORD.

THE ECLIPSE PETROLEUM HEATING STOVES.



SIMPLICITY.
ECONOMY.
EFFICIENCY.

NO FIXING.
NO DIRT.
NO TROUBLE.

THE ECLIPSE PETROLEUM HEATING STOVES

Are unequalled for practical utility and convenience of application. They are adapted for every purpose where artificial heat is required; make neither smoke nor smell. They are made in five different sizes, with one, two, three, four, or five mammoth (1½ inch) burners, and are specially suitable for Orchard Houses, also for Conservatories, Greenhouses, Bedrooms, Sick-rooms, Studies, Offices, Halls, Chapels, Schoolrooms, &c.

One customer reports that with one 2-light, used in a greenhouse containing about 2,240 cubic feet, when the thermometer registered 16 degrees of frost outside, the lowest point reached in the house was 40 degrees of Fahrenheit.

The advantages over coal or gas stoves are numerous and obvious; as, for instance, their economy, the consumption of oil costing about ½*d.* per hour per burner; their simplicity, which enables an ordinary domestic to manage them; their portability, which allows of their being moved at pleasure from room to room; their not requiring any chimney, and consequently passing their entire heat into the room without in the least vitiating the atmosphere—thus forming a striking contrast to the ordinary coal fires, where often nine-tenths of the heat passes up the chimney.

Hundreds of testimonials of their economy and efficiency may be seen, but the surest recommendation to their excellence is the annual increase of the sale.

Prices—8s., 12s., 18s. 6d., and upwards.

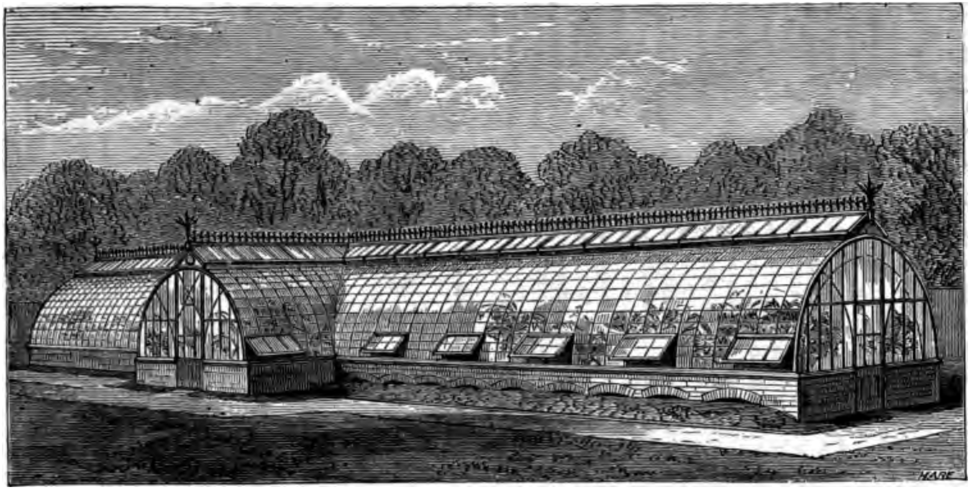
E. ALLCOCK,
IRONMONGER.
SAWBRIDGEWORTH, HERTS.

LEGION OF HONOUR (PARIS EXHIBITION), GOLD MEDAL.

W. H. LASCELLES,
HORTICULTURAL BUILDER,

121 BUNHILL ROW, LONDON, E.C.

Range of Patent Bent Wood Curved Vineries, Plant-houses, &c., recently erected at Croydon. These houses are light, strong, durable, and of elegant



appearance. Can be made as cheaply as a plain, straight house, and no bent glass need be used. Illustrated Sheets sent post free on application, and estimates given without charge.

GOLD MEDAL—PARIS, 1878,

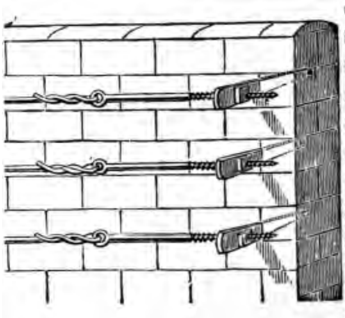
For Wire applied to Horticultural purposes.

J. J. THOMAS & CO.

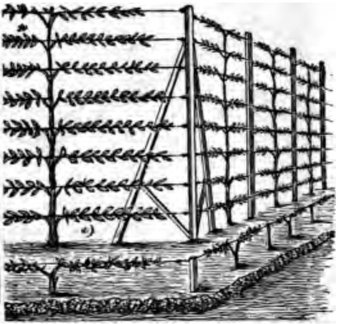
Paddington Iron and Wire Works,

285 & 362 EDGWARE ROAD, LONDON, W.

Thomas's Galvanised Wrought-Iron Fittings for Wiring Walls and Erecting Trellises, for the purpose of Training Fruit Trees.



By this system nails and shreds are entirely dispensed with, the walls are not injured, and no harbour is afforded to small insects. The tying of the fruit tree is effected in one-fifth of the time required by the old system. The arrangement is so simple that it can easily be applied to any walls by inexperienced hands.

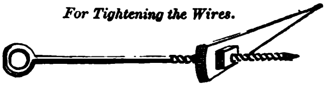


The arrangement of these Trainers is much improved, and is now rendered so simple that they can be readily fixed by inexperienced hands. The bases of the terminating and intermediate standards are of iron, and require neither wood nor stone to attach them to. The wires are usually placed about 8 inches apart.

REDUCED PRICES OF MATERIALS, 1879.

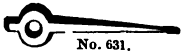
Galvanized Straining Bolt, No. 635.

For Tightening the Wires.



One required for each line of Wire. Price 4s. per doz.
Key for winding ditto, 4d. each.

Improved Galvanized Eyes, No. 631.



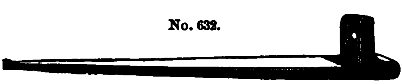
No. 631.

Spaced about 10 feet apart for guiding the Wires on the wall.

1½	2	2½	3	3½	4½	inches long.
2d.	3d.	4d.	5d.	7d.	9d.	per dozen.

IMPROVED
Galvanized Terminal Holdfast, No. 632.

No. 632.



5 inches long. Price 2s. per dozen.

The above pattern Eyes and Holdfasts are very much superior to those generally in use; being made with a shoulder, they do not break when being driven into the hardest wall. STRONGLY RECOMMENDED.

Iron Terminating Posts, No. 159.

	Painted. s. d.	Galvanized. £ s. d.
4 feet high	8 0	0 13 0
5 " "	9 6	0 15 0
6 " "	10 6	0 16 0
7 " "	15 0	1 1 0
8 " "	18 0	1 5 0

Intermediate Standards, No. 160.

4 feet high	1 4	0 2 1
5 " "	1 7	0 2 10
6 " "	1 11	0 3 5
7 " "	2 2	0 3 9
8 " "	2 6	0 4 3

Best Quality Galvanized Wire.

Specially prepared.
1s. 6d., 1s. 9d., 2s. 0d. per 100 yards.

Galvanized Wire Netting.

Reduced Prices.

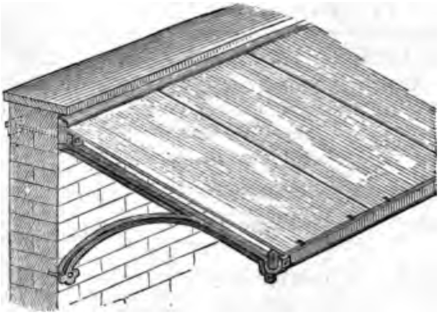
	2 ft.	3 ft.	4 ft. wide.	
2-in. Mesh	2½d.	3¾d.	5d.	per yard.
1½ "	3½d.	5d.	7½d.	"
1 "	7d.	10½d.	1s. 2d.	"

Other meshes and widths in stock at proportionate prices.

Illustrated and descriptive priced Catalogues of the above, and every description of Wire and Iron Work, with full information as to the different sizes and qualities, on application.

10 per Cent. Discount allowed for Cash with Order.

RICHARDSON'S GLASS WALL TREE PROTECTOR.



CHEAPEST
EVER
SUPPLIED.

GUARANTEED BEST QUALITY.

2 ft. wide, 1s. 10d. per ft. run; 3 ft. wide, 2s. 6d. per ft. run.
Carriage paid for orders over £5.

Send for particulars to

W. RICHARDSON & CO.
HORTICULTURAL BUILDERS AND HOT WATER ENGINEERS,
DARLINGTON.

THE BEST KINDS OF

STANDARD AND DWARF ROSES,

TRAINED AND PYRAMIDAL FRUIT TREES FOR GARDENS,

AND

STANDARD TREES FOR ORCHARDS,

ARE GROWN IN LARGE QUANTITIES.

FRUITING ORCHARD-HOUSE TREES AND VINES

CAN BE SUPPLIED AT ANY PERIOD OF THE YEAR.

Orchard Houses when built can be Stocked without delay.

THOMAS RIVERS & SON,
NURSERIES,
SAWBRIDGEWORTH, HERTS.

THOMAS RIVERS & SON,

THE NURSERIES,

SAWBRIDGEWORTH.

THE DESCRIPTIVE AND ILLUSTRATED

CATALOGUE OF FRUITS.

3*d.* post-free.

All the sorts of Trees described in this Catalogue have been selected after a long and careful trial of the quality of the fruit.

THE DESCRIPTIVE

CATALOGUE OF ROSES.

Post-free.

The Nurseries extend over more than 100 acres of land exclusively devoted to the cultivation of Fruit Trees and Roses, the soil being eminently adapted for this purpose. The climate produces a hardy constitution in all Fruit Trees and Roses, and they will bear removal to any part of the United Kingdom without injury.

The Nurseries are near the Harlow and Sawbridgeworth Stations on the Great Eastern Railway.

The Orchard Houses contain Specimen Trees on Fruit during the greater part of the Summer.

THOMAS RIVERS & SON,
SAWBRIDGEWORTH, HERTS.